APPENDIX D

DATA QUALITY ASSURANCE REVIEW MEMORANDUMS AND ANALYTICAL DATA FORMS

ENVIRONMENTAL SERVICES ASSISTANCE TEAM

ESAT Region 10
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Port Orchard, WA 98366
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DELIVERABLE NARRATIVE

DATE: August 6, 2001

To: Ginna Grepo-Grove, TOPO, USEPA, Region 10

THROUGH: Dave Dobb, Team Manager, ESAT Region 10 GMG for D.D

FROM: Chris Pace, Data Validation Task Lead, ESAT Region 10 CP

SUBJECT: Data Validation Report for the Inorganic Analysis of Samples from the Upper Columbia River Lake Roosevelt/Mines Sites. Case: 29440 SDG: MJ0ES7

Account Code: 01T10P50102D106XLA00

Doc. #: ES10-0-1124
TDN: 1048
Task Order: 001
Contract: 68-W-01-027

CC: Gerald Dodo, PO, USEPA, Region 10
Project File

The quality assurance (QA) review of 18 soil samples collected from the above referenced site has been completed. These samples were analyzed for total metals by Sentinel, Inc. of Huntsville, AL. The following samples were reviewed in this validation report:

MJ0ES7	MJ0ET3	MJ0ET8	MJ0EW3
MJ0ES8	MJ0ET4	MJ0ET9	MJ0EW4
MJ0ES9	MJ0ET5	MJ0EW0	MJ0EW5
MJ0ET0	MJ0ET6	MJ0EW1	
MJ0ET1	MJ0ET7	MJ0EW2	

DATA QUALIFICATIONS

The following comments refer to the laboratory performance in meeting the Quality Control Specifications outlined in the Contract Laboratory Program (CLP) Statement of Work (SOW) for Inorganic Analysis (ILM04.1) and the USEPA CLP Functional Guidelines for Inorganic Data Review, 2/94.

The conclusions presented herein are based on the information provided for the review.

Holding Time - Acceptable

The suggested holding time for mercury is 28 days from the date of sample collection and the holding time for the rest of the metals is 180 days. The samples were collected on 6/21/01. The samples were analyzed for mercury within 15 days and all other metals within 19 days of the sample collection date. None of the data were qualified on this basis.

Sample Preparation - Acceptable

The samples were prepared in accordance with the methods used. None of the data were qualified on this basis.

Initial Calibration - Acceptable

All of the samples were analyzed for total mercury using Cold Vapor Atomic Absorption Spectroscopy (CVAAS). The initial calibration for mercury met the frequency of analysis and the linearity criteria (correlation coefficients, r=>0.995).

The rest of the target analytes were analyzed using Inductively Coupled Plasma-Atomic Emission Spectroscopy (ICP-AES). The initial calibration for ICP-AES met the frequency of analysis and the linearity criteria (correlation coefficients, r=>0.995).

None of the data were qualified on this basis.

Calibration Verification - Acceptable

The initial and continuing calibration verifications met the criteria for frequency of analysis and recovery criteria of 90-110% and 80-120% for mercury. The recoveries ranged from 92-109% for ICP-AES and from 82-93% for mercury. None of the data were qualified on this basis.

Detection Limits - Acceptable

All of the target analytes met the project required quantitation limits. All of the Contract Required Detection Limit (CRDL) checks met the frequency of analysis and recovery criteria.

Blanks

Procedural blanks were prepared with the samples to indicate potential contamination from the digestion or analytical procedure. If an analyte was found in the associated blank, the sample results were qualified as non-detects, "U", if the analyte concentration is less than five times the analytical value in the blank.

The frequency of analysis of blanks was met. Based on the target analytes detected in the procedural, initial and continuing calibration blanks, the following results were qualified as non-detects, "U":

Analyte	Associated Samples
sodium	MJ0ET6, MJ0ET9, MJ0EW0, MJ0EW2
thallium	MJ0ES9, MJ0ET0, MJ0ET1, MJ0ET3, MJ0ET4, MJ0ET6, MJ0ET7, MJ0ET8, MJ0EW0, MJ0EW2, MJ0EW5

Zinc was detected above the CRDL in the preparation blank. None of the sample results were affected.

ICP-AES Interference Check Sample - Acceptable

The ICP-AES interference check samples (ICS) were analyzed to verify inter-element and background correction factors. The frequency of analysis (beginning and end of sequence) and recovery criteria (80-120%) were met. The recoveries ranged from 93-114%. None of the data were qualified on this basis.

ICP-AES Serial Dilution Analysis

Sample MJ0ET9 was analyzed for serial dilution. All of the analytes which exceeded the minimum concentration criterion (50 times the IDL) agreed within 10% difference with the exception of potassium. Results for potassium in all samples were qualified as estimated, "J". The "E" qualifiers applied by the laboratory were crossed-out by the reviewer.

Laboratory Control Sample - Acceptable

The frequency of analysis and the recovery criteria for the laboratory control sample was met. The recoveries ranged from 59-108%. None of the data were qualified on this basis.

Duplicate Sample Analysis - Acceptable

Sample MJ0ET9 was utilized for duplicate analysis. The duplicate results met the frequency of analysis and method control limit criteria (±20% RPD or ± CRDL) for all target analytes with the exception of copper. Copper did meet the suggested technical control limit criteria (±35% RPD or ± 2X CRDL) for soils. The "*" qualifiers applied by the laboratory were crossed-out by the reviewer. None of the data were qualified on this basis.

Matrix Spike Analysis

Sample MJ0ET9 was used for the spike analysis. The frequency of analysis and recovery criteria were met with the exception of antimony (68%), arsenic (171%), copper (243%), mercury (-61%) and selenium (64%) in the spike sample MJ0ET9S. Due to possible bias, the detected and non-detected antimony and selenium results in all samples were qualified as estimated, "J/UJ". Due to possible bias, the detected arsenic and copper results in all samples were qualified as estimated, "J". Due to possible bias, the detected mercury results in all samples were qualified as estimated, "J". Mercury was detected in all samples. The "N" qualifiers applied by the laboratory were crossed-out by the reviewer. The recoveries for lead and zinc could not be accurately determined because the concentrations native to the sample were greater than 4 times the amount of spike added to the sample. All of the other spike recoveries were acceptable and ranged from 94-119%.

Laboratory Contact

The laboratory was not contacted for this review.

Overall Assessment

The total number of data points was 414. Fifteen (3.6%) were qualified as non-detected due to blank contamination. One hundred eight (26%) were qualified as estimated due to ICP serial dilution and spike analyses.

All of the samples were analyzed in accordance with technical specifications outlined in the SOW. The data, as qualified, are acceptable and can be used for all purposes.

DATA QUALIFIERS

U	-	The analyte was not detected at or above the reported result.
J	-	The analyte was positively identified. The associated numerical result is an estimate.
R	-	The data are unusable for all purposes.
N	-	There is evidence the analyte is present in this sample.
NJ	-	There is evidence that the analyte is present. The associated numerical result is an estimate.
UJ	-	The analyte was not detected at or above the reported estimated result. The associated numerical value is an estimate of the quantitation limit of the analyte in this sample.
L	-	Low bias.
H	-	High bias.
Q	-	The result is estimated because the concentration is below the Contract Required Quantitation Limits (CRQLs).
K	-	Unknown Bias.

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0FK6

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0FK6

Matrix (soil/water): SOIL Lab Sample ID: 39295S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 94.0

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1570			P
7440-36-0	Antimony	2.5	B	~~N~~ JL	P
7440-38-2	Arsenic	18.4			P
7440-39-3	Barium	47.1			P
7440-41-7	Beryllium	0.14	B		P
7440-43-9	Cadmium	4.0		~~*~~	P
7440-70-2	Calcium	262000		~~*~~ JL	P
7440-47-3	Chromium	3.9			P
7440-48-4	Cobalt	2.5	B		P
7440-50-8	Copper	21.2		~~*~~ JL	P
7439-89-6	Iron	4220			P
7439-92-1	Lead	3010		~~*~~ JK	P
7439-95-4	Magnesium	31000		~~*~~ JK	P
7439-96-5	Manganese	105			P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	73.9			P
7440-09-7	Potassium	985	B		P
7782-49-2	Selenium	3.1			P
7440-22-4	Silver	0.54	B		P
7440-23-5	Sodium	287	B		P
7440-28-0	Thallium	1.1	U		P
7440-62-2	Vanadium	43.8			P
7440-66-6	Zinc	890		~~*~~	P
	Cyanide				NR

CP 8-8-01

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0FK7

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0FK6

Matrix (soil/water): SOIL Lab Sample ID: 39296S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 97.3

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	750			P
7440-36-0	Antimony	1.3	B	~~N~~ JL	P
7440-38-2	Arsenic	21.8			P
7440-39-3	Barium	20.2	B		P
7440-41-7	Beryllium	0.05	B		P
7440-43-9	Cadmium	34.2		#	P
7440-70-2	Calcium	190000		# JL	P
7440-47-3	Chromium	2.0	B		P
7440-48-4	Cobalt	1.1	B		P
7440-50-8	Copper	9.2		# JL	P
7439-89-6	Iron	12400			P
7439-92-1	Lead	8100		# JK	P
7439-95-4	Magnesium	68500		# JK	P
7439-96-5	Manganese	194			P
7439-97-6	Mercury	0.16			CV
7440-02-0	Nickel	20.9			P
7440-09-7	Potassium	303	B		P
7782-49-2	Selenium	0.70	U		P
7440-22-4	Silver	0.93	B		P
7440-23-5	Sodium	364	B		P
7440-28-0	Thallium	1.1	B	U	P
7440-62-2	Vanadium	18.4			P
7440-66-6	Zinc	7420		#	P
	Cyanide				NR

OK 9.8-01

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Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0FK8

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0FK6

Matrix (soil/water): SOIL Lab Sample ID: 39297S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 96.5

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	848			P
7440-36-0	Antimony	2.5	B	~~N~~ JL	P
7440-38-2	Arsenic	35.1			P
7440-39-3	Barium	29.5	B		P
7440-41-7	Beryllium	0.05	B		P
7440-43-9	Cadmium	44.1		~~*~~	P
7440-70-2	Calcium	195000		~~*~~ JL	P
7440-47-3	Chromium	2.8			P
7440-48-4	Cobalt	1.4	B		P
7440-50-8	Copper	10.8		~~*~~ JL	P
7439-89-6	Iron	8510			P
7439-92-1	Lead	6030		~~*~~ JK	P
7439-95-4	Magnesium	62400		~~*~~ JK	P
7439-96-5	Manganese	196			P
7439-97-6	Mercury	0.19			CV
7440-02-0	Nickel	33.6			P
7440-09-7	Potassium	505	B		P
7782-49-2	Selenium	1.7			P
7440-22-4	Silver	0.73	B		P
7440-23-5	Sodium	397	B		P
7440-28-0	Thallium	1.1	B	U	P
7440-62-2	Vanadium	36.0			P
7440-66-6	Zinc	9300		~~*~~	P
	Cyanide				NR

VR 8-8-01

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EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0FL1

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0FK6

Matrix (soil/water): SOIL Lab Sample ID: 39299S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 79.8

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	13500			P
7440-36-0	Antimony	0.71	U	UJK	P
7440-38-2	Arsenic	3.5			P
7440-39-3	Barium	296			P
7440-41-7	Beryllium	0.42	B		P
7440-43-9	Cadmium	0.86	B	J	P
7440-70-2	Calcium	19100		JL	P
7440-47-3	Chromium	22.6			P
7440-48-4	Cobalt	8.0	B		P
7440-50-8	Copper	17.0		JL	P
7439-89-6	Iron	18100			P
7439-92-1	Lead	47.2		JK	P
7439-95-4	Magnesium	3870		JK	P
7439-96-5	Manganese	989			P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	18.9			P
7440-09-7	Potassium	2250			P
7782-49-2	Selenium	0.84	U		P
7440-22-4	Silver	0.68	B		P
7440-23-5	Sodium	386	B		P
7440-28-0	Thallium	1.3	U		P
7440-62-2	Vanadium	35.2			P
7440-66-6	Zinc	201		J	P
	Cyanide				NR

CP 8-8-01

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

ENVIRONMENTAL SERVICES ASSISTANCE TEAM

ESAT Region 10
7411 Beach Drive East
Port Orchard, WA 98366
Phone (360) 871-8723

DELIVERABLE NARRATIVE

DATE: August 7, 2001

To: Ginna Grepo-Grove, TOPO, USEPA, Region 10

THROUGH: Dave Dobb, Team Manager, ESAT Region 10 DD

FROM: Chris Pace, Data Validation Task Lead, ESAT Region 10 CP

SUBJECT: Data Validation Report for the Inorganic Analysis of Samples from the Upper Columbia River Lake Roosevelt/Mines Sites. Case: 29440 SDG: MJ0EN5

Account Code: 01T10P50102D106XLA00

Doc. #: ES10-0-1129
TDN: 1052
Task Order: 001
Contract: 68-W-01-027

CC: Gerald Dodo, PO, USEPA, Region 10
Project File

The quality assurance (QA) review of 20 soil samples collected from the above referenced site has been completed. These samples were analyzed for total metals by Sentinel, Inc. of Huntsville, AL. The following samples were reviewed in this validation report:

MJ0EN5	MJ0EP0	MJ0EP5	MJ0EQ0
MJ0EN6	MJ0EP1	MJ0EP6	MJ0EQ1
MJ0EN7	MJ0EP2	MJ0EP7	MJ0EQ2
MJ0EN8	MJ0EP3	MJ0EP8	MJ0EQ3
MJ0EN9	MJ0EP4	MJ0EP9	MJ0EQ4

DATA QUALIFICATIONS

The following comments refer to the laboratory performance in meeting the Quality Control Specifications outlined in the Contract Laboratory Program (CLP) Statement of Work (SOW) for Inorganic Analysis (ILM04.1) and the USEPA CLP Functional Guidelines for Inorganic Data Review, 2/94.

The conclusions presented herein are based on the information provided for the review.

Holding Time - Acceptable

The suggested holding time for mercury is 28 days from the date of sample collection and the holding time for the rest of the metals is 180 days. The samples were collected on 6/20/01. The samples were analyzed for mercury within 7 days and all other metals within 9 days of the sample collection date. None of the data were qualified on this basis.

Sample Preparation - Acceptable

The samples were prepared in accordance with the methods used. None of the data were qualified on this basis.

Initial Calibration - Acceptable

All of the samples were analyzed for total mercury using Cold Vapor Atomic Absorption Spectroscopy (CVAAS). The initial calibration for mercury met the frequency of analysis and the linearity criteria (correlation coefficients, r=>0.995).

The rest of the target analytes were analyzed using Inductively Coupled Plasma-Atomic Emission Spectroscopy (ICP-AES). The initial calibration for ICP-AES met the frequency of analysis and the linearity criteria (correlation coefficients, r=>0.995).

None of the data were qualified on this basis.

Calibration Verification - Acceptable

The initial and continuing calibration verifications met the criteria for frequency of analysis and recovery criteria of 90-110% and 80-120% for mercury. The recoveries ranged from 96-110% for ICP-AES and from 82-98% for mercury. None of the data were qualified on this basis.

Detection Limits - Acceptable

All of the target analytes met the project required quantitation limits. All of the Contract Required Detection Limit (CRDL) checks met the frequency of analysis and recovery criteria.

Blanks

Procedural blanks were prepared with the samples to indicate potential contamination from the digestion or analytical procedure. If an analyte was found in the associated blank, the sample results were qualified as non-detects, "U", if the analyte concentration is less than five times the analytical value in the blank.

The frequency of analysis of blanks was met. Based on the target analytes detected in the procedural, initial and continuing calibration blanks, the following results were qualified as non-detects, "U":

Analyte	Associated Samples
barium	MJ0EN5, MJ0EQ1
chromium	MJ0EN5, MJ0EQ1, MJ0EQ3
nickel	MJ0EN5

Analytes which yielded a negative response in the preparation blank and/or continuing calibration blank(s) at concentrations comparable to or less than the absolute value of the blank(s) were qualified as estimated, "J/UJ", due to possible low bias. The following samples were qualified:

Analyte	Associated Samples
thallium	All

ICP-AES Interference Check Sample - Acceptable

The ICP-AES interference check samples (ICS) were analyzed to verify inter-element and background correction factors. The frequency of analysis (beginning and end of sequence) and recovery criteria (80-120%) were met. The recoveries ranged from 89-117%. None of the data were qualified on this basis.

ICP-AES Serial Dilution Analysis

Sample MJ0EP5 was analyzed for serial dilution. All of the analytes which exceeded the minimum concentration criterion (50 times the IDL) agreed within 10% difference with the exception of copper. Results for copper in all samples were qualified as estimated, "J". The "E" qualifiers applied by the laboratory were crossed-out by the reviewer.

Laboratory Control Sample - Acceptable

The frequency of analysis and the recovery criteria for the laboratory control sample was met. The recoveries ranged from 65-117%. None of the data were qualified on this basis.

Duplicate Sample Analysis - Acceptable

Sample MJ0EP5 was utilized for duplicate analysis. The duplicate results met the frequency of analysis and method control limit criteria for all target analytes. None of the data were qualified on this basis.

Matrix Spike Analysis

Sample MJ0EP5 was used for the spike analysis. The frequency of analysis and recovery criteria were met with the exception of antimony (46%) in the spike sample MJ0EP5S. Due to possible bias, the detected and non-detected antimony results in all samples were qualified as estimated, "J/UJ". The "N" qualifiers applied by the laboratory were crossed-out by the reviewer. The recoveries for lead and zinc could not be accurately determined because the concentrations native to the sample were greater than 4 times the amount of spike added to the sample. All of the other spike recoveries were acceptable and ranged from 93-120%.

Laboratory Contact

The laboratory was not contacted for this review.

Overall Assessment

The total number of data points was 460. Six (1.3%) were qualified as non-detected due to blank contamination. Sixty (17%) were qualified as estimated due to negative blanks, ICP serial dilution and spike analyses.

All of the samples were analyzed in accordance with technical specifications outlined in the SOW. The data, as qualified, are acceptable and can be used for all purposes.

DATA QUALIFIERS

U	-	The analyte was not detected at or above the reported result.
J	-	The analyte was positively identified. The associated numerical result is an estimate.
R	-	The data are unusable for all purposes.
N	-	There is evidence the analyte is present in this sample.
NJ	-	There is evidence that the analyte is present. The associated numerical result is an estimate.
UJ	-	The analyte was not detected at or above the reported estimated result. The associated numerical value is an estimate of the quantitation limit of the analyte in this sample.
L	-	Low bias.
H	-	High bias.
Q	-	The result is estimated because the concentration is below the Contract Required Quantitation Limits (CRQLs).
K	-	Unknown Bias.

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0F10

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0EQ5

Matrix (soil/water): WATER Lab Sample ID: 39143S

Level (low/med): LOW Date Received: 06/29/01

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	168	U		P
7440-36-0	Antimony	3.0	U		P
7440-38-2	Arsenic	4.0	U		P
7440-39-3	Barium	27.1	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	68300			P
7440-47-3	Chromium	0.70	U		P
7440-48-4	Cobalt	1.1	U		P
7440-50-8	Copper	0.70	U		P
7439-89-6	Iron	54.6	U		P
7439-92-1	Lead	1.5	U		P
7439-95-4	Magnesium	11900			P
7439-96-5	Manganese	1.5	B		P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	1.5	U		P
7440-09-7	Potassium	1410	B		P
7782-49-2	Selenium	3.4	U	UJK	P
7440-22-4	Silver	0.80	U		P
7440-23-5	Sodium	2300	B		P
7440-28-0	Thallium	3.9	U		P
7440-62-2	Vanadium	0.90	U		P
7440-66-6	Zinc	2.5	B	UJK	P
	Cyanide				NR

8-7-01

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

U.S. EPA - CLP
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EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0F11

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0EQ5

Matrix (soil/water): WATER Lab Sample ID: 39144S

Level (low/med): LOW Date Received: 06/29/01

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	168	U		P
7440-36-0	Antimony	3.0	U		P
7440-38-2	Arsenic	4.0	U		P
7440-39-3	Barium	69.5	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.36	B		P
7440-70-2	Calcium	130000			P
7440-47-3	Chromium	0.70	U		P
7440-48-4	Cobalt	1.1	U		P
7440-50-8	Copper	0.70	U		P
7439-89-6	Iron	54.6	U		P
7439-92-1	Lead	1.5	~~B~~ U		P
7439-95-4	Magnesium	31200			P
7439-96-5	Manganese	1.2	B		P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	7.9	B		P
7440-09-7	Potassium	2910	B		P
7782-49-2	Selenium	3.4	U	~~N~~ UJK	P
7440-22-4	Silver	0.80	U		P
7440-23-5	Sodium	3330	B		P
7440-28-0	Thallium	3.9	U		P
7440-62-2	Vanadium	0.90	U		P
7440-66-6	Zinc	63.2		~~N~~ JL	P
	Cyanide				NR

CP 8-7-01

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0F13

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0EQ5

Matrix (soil/water): WATER Lab Sample ID: 39145S

Level (low/med): LOW Date Received: 06/29/01

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	168	U		P
7440-36-0	Antimony	3.0	U		P
7440-38-2	Arsenic	4.0	U		P
7440-39-3	Barium	50.1	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	84400			P
7440-47-3	Chromium	0.70	U		P
7440-48-4	Cobalt	1.1	U		P
7440-50-8	Copper	0.70	U		P
7439-89-6	Iron	54.6	U		P
7439-92-1	Lead	1.5	U		P
7439-95-4	Magnesium	15600			P
7439-96-5	Manganese	0.40	U		P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	1.7	B		P
7440-09-7	Potassium	1740	B		P
7782-49-2	Selenium	3.4	U	#UJK	P
7440-22-4	Silver	0.80	U		P
7440-23-5	Sodium	1580	B		P
7440-28-0	Thallium	3.9	U		P
7440-62-2	Vanadium	0.90	U		P
7440-66-6	Zinc	30.6		#JL	P
_____	Cyanide				NR

8-7-01

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0F15

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0EQ5

Matrix (soil/water): WATER Lab Sample ID: 39146S

Level (low/med): LOW Date Received: 06/29/01

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	195	B		P
7440-36-0	Antimony	3.0	U		P
7440-38-2	Arsenic	4.0	U		P
7440-39-3	Barium	48.5	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	84800			P
7440-47-3	Chromium	0.70	U		P
7440-48-4	Cobalt	1.1	U		P
7440-50-8	Copper	0.70	U		P
7439-89-6	Iron	125			P
7439-92-1	Lead	3.2	U		P
7439-95-4	Magnesium	14500			P
7439-96-5	Manganese	4.5	B		P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	1.6	B		P
7440-09-7	Potassium	1720	B		P
7782-49-2	Selenium	3.4	U	MUJK	P
7440-22-4	Silver	0.80	U		P
7440-23-5	Sodium	1520	B		P
7440-28-0	Thallium	3.9	U		P
7440-62-2	Vanadium	0.90	U		P
7440-66-6	Zinc	36.5		MJL	P
	Cyanide				NR

lf 8-7-01

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0FJ5

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0EQ5

Matrix (soil/water): WATER Lab Sample ID: 38900S

Level (low/med): LOW Date Received: 06/27/01

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	168	U		P
7440-36-0	Antimony	3.0	U		P
7440-38-2	Arsenic	4.0	U		P
7440-39-3	Barium	41.0	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	65600			P
7440-47-3	Chromium	0.70	U		P
7440-48-4	Cobalt	1.1	U		P
7440-50-8	Copper	0.70	U		P
7439-89-6	Iron	54.6	U		P
7439-92-1	Lead	2.9	B	U	P
7439-95-4	Magnesium	35700			P
7439-96-5	Manganese	0.40	U		P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	1.6	B		P
7440-09-7	Potassium	1790	B		P
7782-49-2	Selenium	3.4	U	UJK	P
7440-22-4	Silver	0.80	U		P
7440-23-5	Sodium	1890	B		P
7440-28-0	Thallium	3.9	U		P
7440-62-2	Vanadium	0.90	U		P
7440-66-6	Zinc	575		UJL	P
_____	Cyanide				NR

CP 8-7-01

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

ENVIRONMENTAL SERVICES ASSISTANCE TEAM

ESAT Region 10
7411 Beach Drive East
Port Orchard, WA 98366
Phone (360) 871-8723

DELIVERABLE NARRATIVE

DATE: July 31, 2001

To: Ginna Grepo-Grove, TOPO, USEPA, Region 10

THROUGH: Dave Dobb, Team Manager, ESAT Region 10 DD

FROM: Chris Pace, Data Validation Task Lead, ESAT Region 10 CP

SUBJECT: Data Validation Report for the Inorganic Analysis of Samples from the Upper Columbia River Lake Roosevelt/Mines Sites. Case: 29440 SDG: MJ0GM7

Account Code: 01T10P50102D106XLA00

Doc. #: ES10-0-1116
TDN: 1048
Task Order: 001
Contract: 68-W-01-027

CC: Gerald Dodo, PO, USEPA, Region 10
Project File

The quality assurance (QA) review of 20 soil samples collected from the above referenced site has been completed. These samples were analyzed for total metals by Sentinel, Inc. of Huntsville, AL. The following samples were reviewed in this validation report:

MJ0F18	MJ0F25	MJ0GM7	MJ0GN3
MJ0F19	MJ0F26	MJ0GM9	MJ0GN4
MJ0F20	MJ0F27	MJ0GN0	MJ0GN5
MJ0F21	MJ0FK4	MJ0GN1	MJ0GN6
MJ0F22	MJ0FK5	MJ0GN2	MJ0GN7

DATA QUALIFICATIONS

The following comments refer to the laboratory performance in meeting the Quality Control Specifications outlined in the Contract Laboratory Program (CLP) Statement of Work (SOW) for Inorganic Analysis (ILM04.1) and the USEPA CLP Functional Guidelines for Inorganic Data Review, 2/94.

The conclusions presented herein are based on the information provided for the review.

Holding Time - Acceptable

The suggested holding time for mercury is 28 days from the date of sample collection and the holding time for the rest of the metals is 180 days. The samples were collected on 6/26, 6/27 and 6/28/01. The samples were analyzed for mercury within 20 days and all other metals within 20 days of the sample collection date. None of the data were qualified on this basis.

Sample Preparation - Acceptable

The samples were prepared in accordance with the methods used. None of the data were qualified on this basis.

Initial Calibration - Acceptable

All of the samples were analyzed for total mercury using Cold Vapor Atomic Absorption Spectroscopy (CVAAS). The initial calibration for mercury met the frequency of analysis and the linearity criteria (correlation coefficients, r=>0.995).

The rest of the target analytes were analyzed using Inductively Coupled Plasma-Atomic Emission Spectroscopy (ICP-AES). The initial calibration for ICP-AES met the frequency of analysis and the linearity criteria (correlation coefficients, r=>0.995).

None of the data were qualified on this basis.

Calibration Verification - Acceptable

The initial and continuing calibration verifications met the criteria for frequency of analysis and recovery criteria of 90-110% and 80-120% for mercury. The recoveries ranged from 90-107% for ICP-AES and from 84-95% for mercury. None of the data were qualified on this basis.

Detection Limits - Acceptable

All of the target analytes met the project required quantitation limits. All of the Contract Required Detection Limit (CRDL) checks met the frequency of analysis and recovery criteria.

Blanks

Procedural blanks were prepared with the samples to indicate potential contamination from the digestion or analytical procedure. If an analyte was found in the associated blank, the sample results were qualified as non-detects, "U", if the analyte concentration is less than five times the analytical value in the blank.

The frequency of analysis of blanks was met. Based on the target analytes detected in the procedural, initial and continuing calibration blanks, the following results were qualified as non-detects, "U":

Analyte	Associated Samples
antimony	All except MJ0F19, MJ0GN2
cadmium	MJ0GN5
chromium	MJ0GN2
cobalt	MJ0GN2
selenium	MJ0F21, MJ0GN1, MJ0GN2

silver	MJ0F22, MJ0GM7, MJ0GM9 MJ0GN0, MJ0GN1, MJ0GN3, MJ0GN4, MJ0GN5, MJ0GN6, MJ0GN7

ICP-AES Interference Check Sample - Acceptable

The ICP-AES interference check samples (ICS) were analyzed to verify inter-element and background correction factors. The frequency of analysis (beginning and end of sequence) and recovery criteria (80-120%) were met by all of the ICS analyzed. The recoveries ranged from 94-119%. None of the data were qualified on this basis.

ICP-AES Serial Dilution Analysis

Sample MJ0GN5 was analyzed for serial dilution. All of the analytes which exceeded the minimum concentration criterion (50 times the IDL) agreed within 10% difference with the exception of copper. Results for copper in all samples were qualified as estimated, "J". The "E" qualifiers applied by the laboratory were crossed-out by the reviewer.

Laboratory Control Sample - Acceptable

The frequency of analysis and the recovery criteria for the laboratory control sample was met. The recoveries ranged from 63-132%. None of the data were qualified on this basis.

Duplicate Sample Analysis - Acceptable

Sample MJ0GN5 was utilized for duplicate analysis. The duplicate results met the frequency of analysis and method control limit criteria for all target analytes. None of the data were qualified on this basis.

Matrix Spike Analysis - Acceptable

Sample MJ0GN5 was used for the spike analysis. The frequency of analysis and recovery criteria were met. All of the spike recoveries were acceptable and ranged from 76-107%. None of the data were qualified on this basis.

Laboratory Contact

The laboratory was not contacted for this review.

Overall Assessment

The total number of data points was 460. Thirty four (7.4%) were qualified as non-detected due to blank contamination. Twenty (4.3%) were qualified as estimated due to ICP serial dilution analysis.

All of the samples were analyzed in accordance with technical specifications outlined in the SOW. The data, as qualified, are acceptable and can be used for all purposes.

DATA QUALIFIERS

U	-	The analyte was not detected at or above the reported result.
J	-	The analyte was positively identified. The associated numerical result is an estimate.
R	-	The data are unusable for all purposes.
N	-	There is evidence the analyte is present in this sample.
NJ	-	There is evidence that the analyte is present. The associated numerical result is an estimate.
UJ	-	The analyte was not detected at or above the reported estimated result. The associated numerical value is an estimate of the quantitation limit of the analyte in this sample.
L	-	Low bias.
H	-	High bias.
Q	-	The result is estimated because the concentration is below the Contract Required Quantitation Limits (CRQLs).
K	-	Unknown Bias.

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0F18

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0GM7

Matrix (soil/water): SOIL Lab Sample ID: 39283S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 83.9

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5190			P
7440-36-0	Antimony	4.1	B	U	P
7440-38-2	Arsenic	4.6			P
7440-39-3	Barium	234			P
7440-41-7	Beryllium	0.24	B		P
7440-43-9	Cadmium	8.5			P
7440-70-2	Calcium	65000			P
7440-47-3	Chromium	14.2			P
7440-48-4	Cobalt	9.6	B		P
7440-50-8	Copper	32.3		E JL	P
7439-89-6	Iron	7680			P
7439-92-1	Lead	301			P
7439-95-4	Magnesium	36400			P
7439-96-5	Manganese	4210			P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	15.7			P
7440-09-7	Potassium	249	B		P
7782-49-2	Selenium	0.79	U		P
7440-22-4	Silver	2.8			P
7440-23-5	Sodium	255	B		P
7440-28-0	Thallium	1.2	U		P
7440-62-2	Vanadium	10.5	B		P
7440-66-6	Zinc	784			P
	Cyanide				NR

CF 7-31-01

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0F19

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0GM7

Matrix (soil/water): SOIL Lab Sample ID: 39284S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 58.3

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9280			P
7440-36-0	Antimony	12.7	B		P
7440-38-2	Arsenic	13.8			P
7440-39-3	Barium	123			P
7440-41-7	Beryllium	0.38	B		P
7440-43-9	Cadmium	27.0			P
7440-70-2	Calcium	51900			P
7440-47-3	Chromium	14.8			P
7440-48-4	Cobalt	9.8	B		P
7440-50-8	Copper	71.7		# JL	P
7439-89-6	Iron	20900			P
7439-92-1	Lead	714			P
7439-95-4	Magnesium	33200			P
7439-96-5	Manganese	2230			P
7439-97-6	Mercury	0.09	U		CV
7440-02-0	Nickel	21.1			P
7440-09-7	Potassium	531	B		P
7782-49-2	Selenium	1.2	U		P
7440-22-4	Silver	5.6			P
7440-23-5	Sodium	364	B		P
7440-28-0	Thallium	1.7	U		P
7440-62-2	Vanadium	17.1	B		P
7440-66-6	Zinc	5740			P
	Cyanide				NR

UP 7-31-01

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0F20

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0GM7

Matrix (soil/water): SOIL Lab Sample ID: 39285S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 81.7

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	12900			P
7440-36-0	Antimony	1.1	B	U	P
7440-38-2	Arsenic	6.7			P
7440-39-3	Barium	374			P
7440-41-7	Beryllium	0.49	B		P
7440-43-9	Cadmium	1.2	B		P
7440-70-2	Calcium	2460			P
7440-47-3	Chromium	12.9			P
7440-48-4	Cobalt	12.0	B		P
7440-50-8	Copper	19.7		#JL	P
7439-89-6	Iron	16700			P
7439-92-1	Lead	22.3			P
7439-95-4	Magnesium	4360			P
7439-96-5	Manganese	4050			P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	19.4			P
7440-09-7	Potassium	644	B		P
7782-49-2	Selenium	0.83	U		P
7440-22-4	Silver	0.92	B		P
7440-23-5	Sodium	251	B		P
7440-28-0	Thallium	1.2	U		P
7440-62-2	Vanadium	17.9			P
7440-66-6	Zinc	115			P
	Cyanide				NR

7-31-01

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0FK4

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0GM7

Matrix (soil/water): SOIL Lab Sample ID: 39291S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 70.6

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	476			P
7440-36-0	Antimony	1.8	B	U	P
7440-38-2	Arsenic	17.2			P
7440-39-3	Barium	14.5	B		P
7440-41-7	Beryllium	0.03	U		P
7440-43-9	Cadmium	9.8			P
7440-70-2	Calcium	142000			P
7440-47-3	Chromium	3.0			P
7440-48-4	Cobalt	0.31	U		P
7440-50-8	Copper	23.0		J	P
7439-89-6	Iron	56800			P
7439-92-1	Lead	351			P
7439-95-4	Magnesium	63400			P
7439-96-5	Manganese	202			P
7439-97-6	Mercury	0.09	B		CV
7440-02-0	Nickel	10.3	B		P
7440-09-7	Potassium	164	B		P
7782-49-2	Selenium	0.94	U		P
7440-22-4	Silver	1.7	B		P
7440-23-5	Sodium	287	B		P
7440-28-0	Thallium	2.2	B		P
7440-62-2	Vanadium	9.0	B		P
7440-66-6	Zinc	3320			P
	Cyanide				NR

7-31-01

Color Before: BLACK Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0FK5

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0GM7

Matrix (soil/water): SOIL Lab Sample ID: 39292S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 72.7

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1430			P
7440-36-0	Antimony	1.7	B	4	P
7440-38-2	Arsenic	11.8			P
7440-39-3	Barium	25.5	B		P
7440-41-7	Beryllium	0.10	B		P
7440-43-9	Cadmium	14.6			P
7440-70-2	Calcium	175000			P
7440-47-3	Chromium	12.5			P
7440-48-4	Cobalt	0.75	B		P
7440-50-8	Copper	165		#JL	P
7439-89-6	Iron	17000			P
7439-92-1	Lead	1960			P
7439-95-4	Magnesium	57800			P
7439-96-5	Manganese	254			P
7439-97-6	Mercury	0.39			CV
7440-02-0	Nickel	9.0	B		P
7440-09-7	Potassium	510	B		P
7782-49-2	Selenium	0.93	U		P
7440-22-4	Silver	0.72	B		P
7440-23-5	Sodium	310	B		P
7440-28-0	Thallium	1.4	U		P
7440-62-2	Vanadium	20.8			P
7440-66-6	Zinc	2610			P
	Cyanide				NR

CF 7-31-01

Color Before: GREY Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0GM7

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0GM7

Matrix (soil/water): SOIL Lab Sample ID: 39273S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 70.4

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8400			P
7440-36-0	Antimony	1.1	B	U	P
7440-38-2	Arsenic	5.2			P
7440-39-3	Barium	110			P
7440-41-7	Beryllium	0.36	B		P
7440-43-9	Cadmium	1.6			P
7440-70-2	Calcium	14600			P
7440-47-3	Chromium	25.5			P
7440-48-4	Cobalt	5.5	B		P
7440-50-8	Copper	84.0		JL	P
7439-89-6	Iron	16600			P
7439-92-1	Lead	449			P
7439-95-4	Magnesium	10400			P
7439-96-5	Manganese	313			P
7439-97-6	Mercury	0.07	U		CV
7440-02-0	Nickel	12.3			P
7440-09-7	Potassium	1560			P
7782-49-2	Selenium	0.97	U		P
7440-22-4	Silver	0.72	B	U	P
7440-23-5	Sodium	393	B		P
7440-28-0	Thallium	1.4	U		P
7440-62-2	Vanadium	20.1			P
7440-66-6	Zinc	864			P
	Cyanide				NR

7-31-01

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0GM9

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0GM7

Matrix (soil/water): SOIL Lab Sample ID: 39274S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 45.9

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	11100			P
7440-36-0	Antimony	2.3	B	U	P
7440-38-2	Arsenic	16.3			P
7440-39-3	Barium	183			P
7440-41-7	Beryllium	0.53	B		P
7440-43-9	Cadmium	0.57	B		P
7440-70-2	Calcium	21500			P
7440-47-3	Chromium	17.6			P
7440-48-4	Cobalt	8.2	B		P
7440-50-8	Copper	25.9		E JL	P
7439-89-6	Iron	27000			P
7439-92-1	Lead	35.7			P
7439-95-4	Magnesium	8910			P
7439-96-5	Manganese	921			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	20.9			P
7440-09-7	Potassium	2020	B		P
7782-49-2	Selenium	1.5	U		P
7440-22-4	Silver	1.4	B	U	P
7440-23-5	Sodium	548	B		P
7440-28-0	Thallium	2.2	U		P
7440-62-2	Vanadium	28.3			P
7440-66-6	Zinc	287			P
	Cyanide				NR

CP 7-31-01

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0GN0

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0GM7

Matrix (soil/water): SOIL Lab Sample ID: 39275S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 61.0

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5720			P
7440-36-0	Antimony	1.4	B	U	P
7440-38-2	Arsenic	2.8	B		P
7440-39-3	Barium	57.8	B		P
7440-41-7	Beryllium	0.15	B		P
7440-43-9	Cadmium	0.19	B		P
7440-70-2	Calcium	1390	B		P
7440-47-3	Chromium	10.1			P
7440-48-4	Cobalt	6.5	B		P
7440-50-8	Copper	8.1	B	J4	P
7439-89-6	Iron	15900			P
7439-92-1	Lead	7.6			P
7439-95-4	Magnesium	2410			P
7439-96-5	Manganese	198			P
7439-97-6	Mercury	0.08	U		CV
7440-02-0	Nickel	17.4			P
7440-09-7	Potassium	760	B		P
7782-49-2	Selenium	1.1	U		P
7440-22-4	Silver	0.71	B	U	P
7440-23-5	Sodium	284	B		P
7440-28-0	Thallium	1.7	U		P
7440-62-2	Vanadium	15.6	B		P
7440-66-6	Zinc	60.9			P
	Cyanide				NR

CR 7.31.01

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

U.S. EPA - CLP

1

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0GN1

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0GM7

Matrix (soil/water): SOIL Lab Sample ID: 39276S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 67.2

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2620			P
7440-36-0	Antimony	0.99	B	U	P
7440-38-2	Arsenic	2.3	B		P
7440-39-3	Barium	44.2	B		P
7440-41-7	Beryllium	0.10	B		P
7440-43-9	Cadmium	0.98	B		P
7440-70-2	Calcium	3610			P
7440-47-3	Chromium	6.2			P
7440-48-4	Cobalt	2.3	B		P
7440-50-8	Copper	4.3	B	J	P
7439-89-6	Iron	6700			P
7439-92-1	Lead	4.6			P
7439-95-4	Magnesium	1200	B		P
7439-96-5	Manganese	107			P
7439-97-6	Mercury	0.07	U		CV
7440-02-0	Nickel	12.5			P
7440-09-7	Potassium	405	B		P
7782-49-2	Selenium	1.4	B	U	P
7440-22-4	Silver	0.40	B	U	P
7440-23-5	Sodium	360	B		P
7440-28-0	Thallium	1.5	U		P
7440-62-2	Vanadium	17.4			P
7440-66-6	Zinc	59.8			P
	Cyanide				NR

7-31-01

Color Before: BLACK Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0GN2

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0GM7

Matrix (soil/water): SOIL Lab Sample ID: 39277S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 90.8

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	213			P
7440-36-0	Antimony	5.2	B		P
7440-38-2	Arsenic	6.7			P
7440-39-3	Barium	31.6	B		P
7440-41-7	Beryllium	0.02	U		P
7440-43-9	Cadmium	9.6			P
7440-70-2	Calcium	290000			P
7440-47-3	Chromium	0.86	B	U	P
7440-48-4	Cobalt	0.29	B	U	P
7440-50-8	Copper	6.6		# JL	P
7439-89-6	Iron	807			P
7439-92-1	Lead	17400			P
7439-95-4	Magnesium	10800			P
7439-96-5	Manganese	79.3			P
7439-97-6	Mercury	0.16			CV
7440-02-0	Nickel	5.0	B		P
7440-09-7	Potassium	98.1	B		P
7782-49-2	Selenium	1.3		U	P
7440-22-4	Silver	2.3			P
7440-23-5	Sodium	250	B		P
7440-28-0	Thallium	1.1	U		P
7440-62-2	Vanadium	8.6	B		P
7440-66-6	Zinc	2040			P
	Cyanide				NR

7-31-01

Color Before: GREY Clarity Before: Texture: COARSE

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0GN3

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0GM7

Matrix (soil/water): SOIL Lab Sample ID: 39278S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 79.0

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8950			P
7440-36-0	Antimony	0.98	B	U	P
7440-38-2	Arsenic	4.8			P
7440-39-3	Barium	33.2	B		P
7440-41-7	Beryllium	0.16	B		P
7440-43-9	Cadmium	0.94	B		P
7440-70-2	Calcium	42400			P
7440-47-3	Chromium	18.3			P
7440-48-4	Cobalt	9.2	B		P
7440-50-8	Copper	17.5		# JL	P
7439-89-6	Iron	25900			P
7439-92-1	Lead	19.0			P
7439-95-4	Magnesium	8510			P
7439-96-5	Manganese	437			P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	26.3			P
7440-09-7	Potassium	403	B		P
7782-49-2	Selenium	0.86	U		P
7440-22-4	Silver	0.84	B	U	P
7440-23-5	Sodium	249	B		P
7440-28-0	Thallium	1.3	U		P
7440-62-2	Vanadium	12.2	B		P
7440-66-6	Zinc	263			P
	Cyanide				NR

CP 7-31-01

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0GN4

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0GM7

Matrix (soil/water): SOIL Lab Sample ID: 39279S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 79.8

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5930			P
7440-36-0	Antimony	1.7	B	U	P
7440-38-2	Arsenic	6.0			P
7440-39-3	Barium	49.7	B		P
7440-41-7	Beryllium	0.17	B		P
7440-43-9	Cadmium	0.80	B		P
7440-70-2	Calcium	30500			P
7440-47-3	Chromium	14.4			P
7440-48-4	Cobalt	5.5	B		P
7440-50-8	Copper	16.0		# JL	P
7439-89-6	Iron	13600			P
7439-92-1	Lead	86.8			P
7439-95-4	Magnesium	18700			P
7439-96-5	Manganese	427			P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	14.2			P
7440-09-7	Potassium	985	B		P
7782-49-2	Selenium	0.85	U		P
7440-22-4	Silver	0.57	B	U	P
7440-23-5	Sodium	314	B		P
7440-28-0	Thallium	1.3	U		P
7440-62-2	Vanadium	25.4			P
7440-66-6	Zinc	261			P
	Cyanide				NR

CP 7-31-01

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0GN5

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0GM7

Matrix (soil/water): SOIL Lab Sample ID: 39280S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 77.1

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6020			P
7440-36-0	Antimony	1.0	B	U	P
7440-38-2	Arsenic	5.2			P
7440-39-3	Barium	59.9			P
7440-41-7	Beryllium	0.18	B		P
7440-43-9	Cadmium	0.20	B	U	P
7440-70-2	Calcium	17500			P
7440-47-3	Chromium	13.2			P
7440-48-4	Cobalt	4.8	B		P
7440-50-8	Copper	17.5		E JL	P
7439-89-6	Iron	12500			P
7439-92-1	Lead	7.3			P
7439-95-4	Magnesium	9100			P
7439-96-5	Manganese	243			P
7439-97-6	Mercury	0.07	U		CV
7440-02-0	Nickel	13.3			P
7440-09-7	Potassium	1260	B		P
7782-49-2	Selenium	0.88	U		P
7440-22-4	Silver	0.56	B	U	P
7440-23-5	Sodium	372	B		P
7440-28-0	Thallium	1.3	U		P
7440-62-2	Vanadium	29.5			P
7440-66-6	Zinc	49.7			P
	Cyanide				NR

CP 7-31-01

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0GN6

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0GM7

Matrix (soil/water): SOIL Lab Sample ID: 39281S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 76.6

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8350			P
7440-36-0	Antimony	1.0	B	U	P
7440-38-2	Arsenic	5.3			P
7440-39-3	Barium	102			P
7440-41-7	Beryllium	0.27	B		P
7440-43-9	Cadmium	0.25	B		P
7440-70-2	Calcium	15900			P
7440-47-3	Chromium	17.9			P
7440-48-4	Cobalt	7.6	B		P
7440-50-8	Copper	22.4		# JL	P
7439-89-6	Iron	17000			P
7439-92-1	Lead	10.5			P
7439-95-4	Magnesium	9180			P
7439-96-5	Manganese	429			P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	16.8			P
7440-09-7	Potassium	1600			P
7782-49-2	Selenium	0.88	U		P
7440-22-4	Silver	0.83	B	U	P
7440-23-5	Sodium	328	B		P
7440-28-0	Thallium	1.3	U		P
7440-62-2	Vanadium	32.5			P
7440-66-6	Zinc	74.1			P
_____	Cyanide				NR

CP 7-31-01

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0GN7

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0GM7

Matrix (soil/water): SOIL Lab Sample ID: 39282S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 84.2

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6770			P
7440-36-0	Antimony	0.91	B	U	P
7440-38-2	Arsenic	5.3			P
7440-39-3	Barium	72.4			P
7440-41-7	Beryllium	0.20	B		P
7440-43-9	Cadmium	0.26	B		P
7440-70-2	Calcium	20400			P
7440-47-3	Chromium	16.4			P
7440-48-4	Cobalt	6.8	B		P
7440-50-8	Copper	19.3		E JL	P
7439-89-6	Iron	14200			P
7439-92-1	Lead	8.7			P
7439-95-4	Magnesium	9450			P
7439-96-5	Manganese	345			P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	15.0			P
7440-09-7	Potassium	1260			P
7782-49-2	Selenium	0.81	U		P
7440-22-4	Silver	0.64	B	U	P
7440-23-5	Sodium	336	B		P
7440-28-0	Thallium	1.2	U		P
7440-62-2	Vanadium	30.8			P
7440-66-6	Zinc	53.4			P
	Cyanide				NR

CP 7-31-01

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

ENVIRONMENTAL SERVICES ASSISTANCE TEAM

ESAT Region 10
7411 Beach Drive East
Port Orchard, WA 98366
Phone (360) 871-8723

DELIVERABLE NARRATIVE

DATE: July 30, 2001

To: Ginna Grepo-Grove, TOPO, USEPA, Region 10

THROUGH: Dave Dobb, Team Manager, ESAT Region 10

FROM: Chris Pace, Data Validation Task Lead, ESAT Region 10

SUBJECT: Data Validation Report for the Inorganic Analysis of Samples from the Upper Columbia River Lake Roosevelt/Mines Sites. Case: 29440 SDG: MJ0FJ0

Account Code: 01T10P50102D106XLA00

Doc. #: ES10-0-1114
TDN: 1048
Task Order: 001
Contract: 68-W-01-027

CC: Gerald Dodo, PO, USEPA, Region 10
Project File

The quality assurance (QA) review of 19 soil samples collected from the above referenced site has been completed. These samples were analyzed for total metals by Sentinel, Inc. of Huntsville, AL. The following samples were reviewed in this validation report:

MJ0EZ6	MJ0F01	MJ0F08	MJ0FJ1
MJ0EZ7	MJ0F02	MJ0F09	MJ0FJ2
MJ0EZ8	MJ0F03	MJ0F14	MJ0FJ3
MJ0EZ9	MJ0F04	MJ0F16	MJ0FJ4
MJ0F00	MJ0F05	MJ0FJ0	

DATA QUALIFICATIONS

The following comments refer to the laboratory performance in meeting the Quality Control Specifications outlined in the Contract Laboratory Program (CLP) Statement of Work (SOW) for Inorganic Analysis (ILM04.1) and the USEPA CLP Functional Guidelines for Inorganic Data Review, 2/94.

The conclusions presented herein are based on the information provided for the review.

Holding Time - Acceptable

The suggested holding time for mercury is 28 days from the date of sample collection and the holding time for the rest of the metals is 180 days. The samples were collected on 6/18, 6/24, 6/25, 6/26 and 6/27/01. The samples were analyzed for mercury within 18 days and all other metals within 22 days of the sample collection date. None of the data were qualified on this basis.

Sample Preparation - Acceptable

The samples were prepared in accordance with the methods used. None of the data were qualified on this basis.

Initial Calibration - Acceptable

All of the samples were analyzed for total mercury using Cold Vapor Atomic Absorption Spectroscopy (CVAAS). The initial calibration for mercury met the frequency of analysis and the linearity criteria (correlation coefficients, r=>0.995).

The rest of the target analytes were analyzed using Inductively Coupled Plasma-Atomic Emission Spectroscopy (ICP-AES). The initial calibration for ICP-AES met the frequency of analysis and the linearity criteria (correlation coefficients, r=>0.995).

None of the data were qualified on this basis.

Calibration Verification - Acceptable

The initial and continuing calibration verifications met the criteria for frequency of analysis and recovery criteria of 90-110% and 80-120% for mercury. The recoveries ranged from 91-109% for ICP-AES and from 81-89% for mercury. None of the data were qualified on this basis.

Detection Limits - Acceptable

All of the target analytes met the project required quantitation limits. All of the Contract Required Detection Limit (CRDL) checks met the frequency of analysis and recovery criteria.

Blanks

Procedural blanks were prepared with the samples to indicate potential contamination from the digestion or analytical procedure. If an analyte was found in the associated blank, the sample results were qualified as non-detects, "U", if the analyte concentration is less than five times the analytical value in the blank.

The frequency of analysis of blanks was met. Based on the target analytes detected in the procedural, initial and continuing calibration blanks, the following results were qualified as non-detects, "U":

Analyte	Associated Samples
arsenic	MJ0EZ8, MJ0F08, MJ0F09, MJ0F14, MJ0F16
sodium	MJ0EZ7, MJ0EZ9, MJ0F00, MJ0F02, MJ0F03, MJ0F04, MJ0F05, MJ0F08, MJ0F09, MJ0F14, MJ0F16, MJ0J2, MJ0J3

Analytes which yielded a negative response in the preparation blank and/or continuing calibration blank(s) at concentrations comparable to or less than the absolute value of the blank(s) were qualified as estimated, "J/UJ", due to possible low bias. The following samples were qualified:

Analyte	Associated Samples
thallium	All except MJ0FJ2

ICP-AES Interference Check Sample - Acceptable

The ICP-AES interference check samples (ICS) were analyzed to verify inter-element and background correction factors. The frequency of analysis (beginning and end of sequence) and recovery criteria (80-120%) were met by all of the ICS analyzed. The recoveries ranged from 86-116%. None of the data were qualified on this basis.

ICP-AES Serial Dilution Analysis

Sample MJ0EZ6 was analyzed for serial dilution. All of the analytes which exceeded the minimum concentration criterion (50 times the IDL) agreed within 10% difference with the exception of copper. Results for copper in all samples were qualified as estimated, "J". The "E" qualifiers applied by the laboratory were crossed-out by the reviewer.

Laboratory Control Sample - Acceptable

The frequency of analysis and the recovery criteria for the laboratory control sample was met. The recoveries ranged from 70-154%. None of the data were qualified on this basis.

Duplicate Sample Analysis - Acceptable

Sample MJ0EZ6 was utilized for duplicate analysis. The duplicate results met the frequency of analysis and method control limit criteria (±20% RPD or ± CRDL) for all target analytes with the exception of lead. Lead did meet the suggested technical control limit criteria (±35% RPD or ± 2X CRDL) for soils. The "*" qualifiers applied by the laboratory were crossed-out by the reviewer. None of the data were qualified on this basis.

Matrix Spike Analysis

Sample MJ0EZ6 was used for the spike analysis. The frequency of analysis and recovery criteria were met with the exception of antimony (45%) and zinc (142%) in the spike sample MJ0EZ6S. Due to possible bias, the detected and non-detected antimony results in all samples were qualified as estimated, "J/UJ". Due to possible bias, the detected zinc results in all samples were qualified as estimated, "J". The "N" qualifiers applied by the laboratory were crossed-out by the reviewer. The recoveries for lead and manganese could not be accurately determined because the concentrations native to the sample were greater than 4 times the amount of spike added to the sample. All of the other spike recoveries were acceptable and ranged from 77-105%.

Laboratory Contact

The laboratory was not contacted for this review.

Overall Assessment

The total number of data points was 437. Eighteen (4.1%) were qualified as non-detected due to blank contamination. Seventy five (17%) were qualified as estimated due to negative blanks, ICP serial dilution and spike analyses.

All of the samples were analyzed in accordance with technical specifications outlined in the SOW. The data, as qualified, are acceptable and can be used for all purposes.

DATA QUALIFIERS

U	-	The analyte was not detected at or above the reported result.
J	-	The analyte was positively identified. The associated numerical result is an estimate.
R	-	The data are unusable for all purposes.
N	-	There is evidence the analyte is present in this sample.
NJ	-	There is evidence that the analyte is present. The associated numerical result is an estimate.
UJ	-	The analyte was not detected at or above the reported estimated result. The associated numerical value is an estimate of the quantitation limit of the analyte in this sample.
L	-	Low bias.
H	-	High bias.
Q	-	The result is estimated because the concentration is below the Contract Required Quantitation Limits (CRQLs).
K	-	Unknown Bias.

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0EZ7

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0FJ0

Matrix (soil/water): SOIL Lab Sample ID: 39148S

Level (low/med): LOW Date Received: 06/29/01

% Solids: 82.3

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	325			P
7440-36-0	Antimony	2.5	B	~~N~~ JL	P
7440-38-2	Arsenic	20.6			P
7440-39-3	Barium	20.3	B		P
7440-41-7	Beryllium	0.05	U		P
7440-43-9	Cadmium	15.0			P
7440-70-2	Calcium	182000			P
7440-47-3	Chromium	10.4			P
7440-48-4	Cobalt	0.65	B		P
7440-50-8	Copper	176		~~E~~ JL	P
7439-89-6	Iron	32000			P
7439-92-1	Lead	680		~~*~~	P
7439-95-4	Magnesium	74300			P
7439-96-5	Manganese	228			P
7439-97-6	Mercury	0.25			CV
7440-02-0	Nickel	9.6	B		P
7440-09-7	Potassium	195	B		P
7782-49-2	Selenium	0.83	U		P
7440-22-4	Silver	0.65	B		P
7440-23-5	Sodium	129	B	U	P
7440-28-0	Thallium	0.95	U	UJK	P
7440-62-2	Vanadium	7.2	B		P
7440-66-6	Zinc	4130		~~N~~ JH	P
	Cyanide				NR

cf 7-30-01

Color Before: GREY Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0EZ8

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0FJ0

Matrix (soil/water): SOIL Lab Sample ID: 39149S

Level (low/med): LOW Date Received: 06/29/01

% Solids: 71.3

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8080			P
7440-36-0	Antimony	0.82	U	UJK	P
7440-38-2	Arsenic	5.1		UJ	P
7440-39-3	Barium	71.1			P
7440-41-7	Beryllium	0.26	B		P
7440-43-9	Cadmium	0.08	U		P
7440-70-2	Calcium	16900			P
7440-47-3	Chromium	19.2			P
7440-48-4	Cobalt	8.0	B		P
7440-50-8	Copper	27.6		JL	P
7439-89-6	Iron	15900			P
7439-92-1	Lead	9.5		J	P
7439-95-4	Magnesium	8460			P
7439-96-5	Manganese	310			P
7439-97-6	Mercury	0.07	U		CV
7440-02-0	Nickel	18.9			P
7440-09-7	Potassium	1340	B		P
7782-49-2	Selenium	0.94	U		P
7440-22-4	Silver	0.68	B		P
7440-23-5	Sodium	250	B		P
7440-28-0	Thallium	1.1	U	UJK	P
7440-62-2	Vanadium	36.3			P
7440-66-6	Zinc	67.6		J	P
	Cyanide				NR

CP 7-30-01

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0EZ9

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0FJ0

Matrix (soil/water): SOIL Lab Sample ID: 39150S

Level (low/med): LOW Date Received: 06/29/01

% Solids: 75.4

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4680			P
7440-36-0	Antimony	1.1	B	~~N~~ JL	P
7440-38-2	Arsenic	18.9			P
7440-39-3	Barium	70.4			P
7440-41-7	Beryllium	0.14	B		P
7440-43-9	Cadmium	9.2			P
7440-70-2	Calcium	94100			P
7440-47-3	Chromium	13.9			P
7440-48-4	Cobalt	3.3	B		P
7440-50-8	Copper	58.3		~~E~~ JL	P
7439-89-6	Iron	37800			P
7439-92-1	Lead	467		J	P
7439-95-4	Magnesium	42300			P
7439-96-5	Manganese	279			P
7439-97-6	Mercury	0.16			CV
7440-02-0	Nickel	15.1			P
7440-09-7	Potassium	665	B		P
7782-49-2	Selenium	0.90	U		P
7440-22-4	Silver	1.1	B		P
7440-23-5	Sodium	193	~~B~~	U	P
7440-28-0	Thallium	1.0	U	UJK	P
7440-62-2	Vanadium	24.0			P
7440-66-6	Zinc	2190		~~N~~ JH	P
	Cyanide				NR

CP 7-30-01

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0F00

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0FJ0

Matrix (soil/water): SOIL Lab Sample ID: 39151S

Level (low/med): LOW Date Received: 06/29/01

% Solids: 86.7

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	146			P
7440-36-0	Antimony	1.5	B	~~N~~ JL	P
7440-38-2	Arsenic	19.8			P
7440-39-3	Barium	8.7	B		P
7440-41-7	Beryllium	0.05	U		P
7440-43-9	Cadmium	8.5			P
7440-70-2	Calcium	152000			P
7440-47-3	Chromium	3.9			P
7440-48-4	Cobalt	0.25	U		P
7440-50-8	Copper	90.0		~~J~~ JL	P
7439-89-6	Iron	62700			P
7439-92-1	Lead	666		~~J~~	P
7439-95-4	Magnesium	97400			P
7439-96-5	Manganese	220			P
7439-97-6	Mercury	0.15			CV
7440-02-0	Nickel	20.0			P
7440-09-7	Potassium	74.3	B		P
7782-49-2	Selenium	0.78	U		P
7440-22-4	Silver	0.98	B		P
7440-23-5	Sodium	95.3	~~B~~ U		P
7440-28-0	Thallium	0.89	U	UJK	P
7440-62-2	Vanadium	3.7	B		P
7440-66-6	Zinc	1590		~~N~~ JH	P
	Cyanide				NR

of 7-30-01

Color Before: GREY Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0F01

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0FJ0

Matrix (soil/water): SOIL Lab Sample ID: 39152S

Level (low/med): LOW Date Received: 06/29/01

% Solids: 94.4

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	312			P
7440-36-0	Antimony	2.1	B	~~N~~ JL	P
7440-38-2	Arsenic	40.0			P
7440-39-3	Barium	7.8	B		P
7440-41-7	Beryllium	0.04	U		P
7440-43-9	Cadmium	8.2			P
7440-70-2	Calcium	117000			P
7440-47-3	Chromium	2.7			P
7440-48-4	Cobalt	0.23	U		P
7440-50-8	Copper	40.3		~~J~~ JL	P
7439-89-6	Iron	171000			P
7439-92-1	Lead	1650		J	P
7439-95-4	Magnesium	70800			P
7439-96-5	Manganese	214			P
7439-97-6	Mercury	0.10			CV
7440-02-0	Nickel	21.4			P
7440-09-7	Potassium	87.7	B		P
7782-49-2	Selenium	0.71	U		P
7440-22-4	Silver	2.3			P
7440-23-5	Sodium	27.5	U		P
7440-28-0	Thallium	0.82	U	UJK	P
7440-62-2	Vanadium	5.1	B		P
7440-66-6	Zinc	2500		~~N~~ JH	P
	Cyanide				NR

CP 7-30-01

Color Before: BLACK Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0F02

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0FJ0

Matrix (soil/water): SOIL Lab Sample ID: 39153S

Level (low/med): LOW Date Received: 06/29/01

% Solids: 78.6

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	243			P
7440-36-0	Antimony	1.6	B	~~N~~ JL	P
7440-38-2	Arsenic	20.8			P
7440-39-3	Barium	10.0	B		P
7440-41-7	Beryllium	0.05	U		P
7440-43-9	Cadmium	11.9			P
7440-70-2	Calcium	148000			P
7440-47-3	Chromium	7.1			P
7440-48-4	Cobalt	0.28	U		P
7440-50-8	Copper	178		~~N~~ JL	P
7439-89-6	Iron	60800			P
7439-92-1	Lead	818		~~N~~	P
7439-95-4	Magnesium	91800			P
7439-96-5	Manganese	236			P
7439-97-6	Mercury	0.18			CV
7440-02-0	Nickel	16.6			P
7440-09-7	Potassium	134	B		P
7782-49-2	Selenium	0.87	U		P
7440-22-4	Silver	1.3	B		P
7440-23-5	Sodium	146	~~B~~ U		P
7440-28-0	Thallium	0.99	U	UJK	P
7440-62-2	Vanadium	9.0	B		P
7440-66-6	Zinc	2520		~~N~~ JH	P
	Cyanide				NR

CP 7-30-01

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0F03

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0FJ0

Matrix (soil/water): SOIL Lab Sample ID: 39326S

Level (low/med): LOW Date Received: 06/29/01

% Solids: 75.4

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	614			P
7440-36-0	Antimony	2.0	B	N J L	P
7440-38-2	Arsenic	26.4			P
7440-39-3	Barium	15.7	B		P
7440-41-7	Beryllium	0.05	U		P
7440-43-9	Cadmium	30.4			P
7440-70-2	Calcium	159000			P
7440-47-3	Chromium	14.3			P
7440-48-4	Cobalt	0.44	B		P
7440-50-8	Copper	242		N JL	P
7439-89-6	Iron	61800			P
7439-92-1	Lead	1760		J	P
7439-95-4	Magnesium	69200			P
7439-96-5	Manganese	217			P
7439-97-6	Mercury	0.58			CV
7440-02-0	Nickel	16.1			P
7440-09-7	Potassium	336	B		P
7782-49-2	Selenium	0.90	U		P
7440-22-4	Silver	1.3	B		P
7440-23-5	Sodium	74.4	~~B~~ U		P
7440-28-0	Thallium	1.0	U	U JK	P
7440-62-2	Vanadium	11.0	B		P
7440-66-6	Zinc	6540		N JH	P
_____	Cyanide				NR

CP 7-30-01

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0F04

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0FJ0

Matrix (soil/water): SOIL Lab Sample ID: 39154S

Level (low/med): LOW Date Received: 06/29/01

% Solids: 81.8

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	293			P
7440-36-0	Antimony	1.5	B	~~N~~ JL	P
7440-38-2	Arsenic	22.4			P
7440-39-3	Barium	10.2	B		P
7440-41-7	Beryllium	0.05	U		P
7440-43-9	Cadmium	20.1			P
7440-70-2	Calcium	156000			P
7440-47-3	Chromium	8.0			P
7440-48-4	Cobalt	0.27	U		P
7440-50-8	Copper	113		~~J~~ JL	P
7439-89-6	Iron	61100			P
7439-92-1	Lead	1000		~~J~~	P
7439-95-4	Magnesium	81800			P
7439-96-5	Manganese	208			P
7439-97-6	Mercury	0.25			CV
7440-02-0	Nickel	13.7			P
7440-09-7	Potassium	156	B		P
7782-49-2	Selenium	0.82	U		P
7440-22-4	Silver	1.1	B		P
7440-23-5	Sodium	82.6	~~B~~ U		P
7440-28-0	Thallium	0.94	U	UJK	P
7440-62-2	Vanadium	7.6	B		P
7440-66-6	Zinc	4540		~~N~~ JH	P
	Cyanide				NR

DP 7-30-01

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0F05

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0FJ0

Matrix (soil/water): SOIL Lab Sample ID: 39155S

Level (low/med): LOW Date Received: 06/29/01

% Solids: 83.4

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	222			P
7440-36-0	Antimony	1.5	B	~~N~~ JL	P
7440-38-2	Arsenic	21.1			P
7440-39-3	Barium	8.9	B		P
7440-41-7	Beryllium	0.05	U		P
7440-43-9	Cadmium	10.4			P
7440-70-2	Calcium	158000			P
7440-47-3	Chromium	7.2			P
7440-48-4	Cobalt	0.26	U		P
7440-50-8	Copper	88.0		~~N~~ JL	P
7439-89-6	Iron	56000			P
7439-92-1	Lead	919		~~N~~	P
7439-95-4	Magnesium	73300			P
7439-96-5	Manganese	184			P
7439-97-6	Mercury	0.16			CV
7440-02-0	Nickel	13.7			P
7440-09-7	Potassium	145	B		P
7782-49-2	Selenium	0.80	U		P
7440-22-4	Silver	0.92	B		P
7440-23-5	Sodium	108	~~B~~	U	P
7440-28-0	Thallium	0.92	U	UJK	P
7440-62-2	Vanadium	7.6	B		P
7440-66-6	Zinc	2270		~~N~~ JH	P
	Cyanide				NR

CP 7-30-01

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0F08

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0FJ0

Matrix (soil/water): SOIL Lab Sample ID: 39156S

Level (low/med): LOW Date Received: 06/29/01

% Solids: 57.1

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2100			P
7440-36-0	Antimony	1.0	U	UJK	P
7440-38-2	Arsenic	7.6		U	P
7440-39-3	Barium	44.2	B		P
7440-41-7	Beryllium	0.10	B		P
7440-43-9	Cadmium	3.5			P
7440-70-2	Calcium	115000			P
7440-47-3	Chromium	9.2			P
7440-48-4	Cobalt	1.7	B		P
7440-50-8	Copper	22.5		JL	P
7439-89-6	Iron	6130			P
7439-92-1	Lead	180			P
7439-95-4	Magnesium	35500			P
7439-96-5	Manganese	455			P
7439-97-6	Mercury	0.11	B		CV
7440-02-0	Nickel	44.8			P
7440-09-7	Potassium	373	B		P
7782-49-2	Selenium	1.2	U		P
7440-22-4	Silver	0.28	U		P
7440-23-5	Sodium	177	B	U	P
7440-28-0	Thallium	1.4	U	UJK	P
7440-62-2	Vanadium	26.8			P
7440-66-6	Zinc	326		JH	P
	Cyanide				NR

7-30-01

Color Before: BLACK Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0F09

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0FJ0

Matrix (soil/water): SOIL Lab Sample ID: 39157S

Level (low/med): LOW Date Received: 06/29/01

% Solids: 69.7

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2960			P
7440-36-0	Antimony	0.86	U	UJK	P
7440-38-2	Arsenic	4.7		J	P
7440-39-3	Barium	48.6	B		P
7440-41-7	Beryllium	0.10	B		P
7440-43-9	Cadmium	1.4	B		P
7440-70-2	Calcium	202000			P
7440-47-3	Chromium	5.7			P
7440-48-4	Cobalt	2.8	B		P
7440-50-8	Copper	9.2		JL	P
7439-89-6	Iron	8120			P
7439-92-1	Lead	6.8		J	P
7439-95-4	Magnesium	7090			P
7439-96-5	Manganese	211			P
7439-97-6	Mercury	0.07	U		CV
7440-02-0	Nickel	13.8			P
7440-09-7	Potassium	293	B		P
7782-49-2	Selenium	0.98	U		P
7440-22-4	Silver	0.23	U		P
7440-23-5	Sodium	152	B	U	P
7440-28-0	Thallium	1.1	U	UJK	P
7440-62-2	Vanadium	11.9	B		P
7440-66-6	Zinc	65.2		JH	P
	Cyanide				NR

CP 7-30-01

Color Before: GREY Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0F14

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0FJ0

Matrix (soil/water): SOIL Lab Sample ID: 39158S

Level (low/med): LOW Date Received: 06/29/01

% Solids: 38.7

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6760			P
7440-36-0	Antimony	1.5	U	UJK	P
7440-38-2	Arsenic	9.1		U	P
7440-39-3	Barium	114			P
7440-41-7	Beryllium	0.28	B		P
7440-43-9	Cadmium	2.8			P
7440-70-2	Calcium	35400			P
7440-47-3	Chromium	11.9			P
7440-48-4	Cobalt	4.5	B		P
7440-50-8	Copper	23.0		JL	P
7439-89-6	Iron	12000			P
7439-92-1	Lead	72.5			P
7439-95-4	Magnesium	8730			P
7439-96-5	Manganese	194			P
7439-97-6	Mercury	0.13	U		CV
7440-02-0	Nickel	44.9			P
7440-09-7	Potassium	915	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	0.65	B		P
7440-23-5	Sodium	231	B	U	P
7440-28-0	Thallium	2.0	U	UJK	P
7440-62-2	Vanadium	19.7	B		P
7440-66-6	Zinc	560		JH	P
	Cyanide				NR

CP 7-30-01

Color Before: BLACK Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0F16

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0FJ0

Matrix (soil/water): SOIL Lab Sample ID: 39159S

Level (low/med): LOW Date Received: 06/29/01

% Solids: 84.9

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3640			P
7440-36-0	Antimony	0.70	U	UJK	P
7440-38-2	Arsenic	3.6		U	P
7440-39-3	Barium	59.0			P
7440-41-7	Beryllium	0.13	B		P
7440-43-9	Cadmium	1.7			P
7440-70-2	Calcium	70500			P
7440-47-3	Chromium	6.5			P
7440-48-4	Cobalt	4.4	B		P
7440-50-8	Copper	8.9		JL	P
7439-89-6	Iron	9540			P
7439-92-1	Lead	59.9			P
7439-95-4	Magnesium	32200			P
7439-96-5	Manganese	341			P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	17.3			P
7440-09-7	Potassium	392	B		P
7782-49-2	Selenium	0.79	U		P
7440-22-4	Silver	0.30	B		P
7440-23-5	Sodium	106	B	U	P
7440-28-0	Thallium	0.91	U	UJK	P
7440-62-2	Vanadium	11.4	B		P
7440-66-6	Zinc	329		JH	P
	Cyanide				NR

CP 7-30-01

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

ENVIRONMENTAL SERVICES ASSISTANCE TEAM

ESAT Region 10
7411 Beach Drive East
Port Orchard, WA 98366
Phone (360) 871-8723

DELIVERABLE NARRATIVE

DATE: August 3, 2001

To: Ginna Grepo-Grove, TOPO, USEPA, Region 10

THROUGH: Dave Dobb, Team Manager, ESAT Region 10 DD

FROM: Chris Pace, Data Validation Task Lead, ESAT Region 10 CP

SUBJECT: Data Validation Report for the Inorganic Analysis of Samples from the Upper Columbia River Lake Roosevelt/Mines Sites. Case: 29440 SDG: MJ0GL0

Account Code: 01T10P50102D106XLA00

Doc. #: ES10-0-1121
TDN: 1048
Task Order: 001
Contract: 68-W-01-027

CC: Gerald Dodo, PO, USEPA, Region 10
Project File

The quality assurance (QA) review of 10 water samples collected from the above referenced site has been completed. These samples were analyzed for total metals by Sentinel, Inc. of Huntsville, AL. The following samples were reviewed in this validation report:

MJ0F17	MJ0GM4
MJ0FK9	MJ0GM6
MJ0GL0	MJ0GM8
MJ0GL9	MJ0GN8
MJ0GM1	MJ0GN9

DATA QUALIFICATIONS

The following comments refer to the laboratory performance in meeting the Quality Control Specifications outlined in the Contract Laboratory Program (CLP) Statement of Work (SOW) for Inorganic Analysis (ILM04.1) and the USEPA CLP Functional Guidelines for Inorganic Data Review, 2/94.

The conclusions presented herein are based on the information provided for the review.

Holding Time - Acceptable

The suggested holding time for mercury is 28 days from the date of sample collection and the holding time for the rest of the metals is 180 days. The samples were collected on 6/25, 6/26, 6/27 and 6/28/01. The samples were analyzed for mercury within 16 days and all other metals within 17 days of the sample collection date. None of the data were qualified on this basis.

Sample Preparation - Acceptable

The samples were prepared in accordance with the methods used. None of the data were qualified on this basis.

Initial Calibration - Acceptable

All of the samples were analyzed for total mercury using Cold Vapor Atomic Absorption Spectroscopy (CVAAS). The initial calibration for mercury met the frequency of analysis and the linearity criteria (correlation coefficients, r=>0.995).

The rest of the target analytes were analyzed using Inductively Coupled Plasma-Atomic Emission Spectroscopy (ICP-AES). The initial calibration for ICP-AES met the frequency of analysis and the linearity criteria (correlation coefficients, r=>0.995).

None of the data were qualified on this basis.

Calibration Verification - Acceptable

The initial and continuing calibration verifications met the criteria for frequency of analysis and recovery criteria of 90-110% and 80-120% for mercury. The recoveries ranged from 94-110% for ICP-AES and from 92-103% for mercury. None of the data were qualified on this basis.

Detection Limits - Acceptable

All of the target analytes met the project required quantitation limits. All of the Contract Required Detection Limit (CRDL) checks met the frequency of analysis and recovery criteria.

Blanks

Procedural blanks were prepared with the samples to indicate potential contamination from the digestion or analytical procedure. If an analyte was found in the associated blank, the sample results were qualified as non-detects, "U", if the analyte concentration is less than five times the analytical value in the blank.

The frequency of analysis of blanks was met. Based on the target analytes detected in the procedural, initial and continuing calibration blanks, the following results were qualified as non-detects, "U":

Analyte	Associated Samples
iron	MJ0FK9, MJ0GL0, MJ0GM8, MJ0GN9
sodium	All

Analytes which yielded a negative response in the preparation blank and/or continuing calibration blank(s) at concentrations comparable to or less than the absolute value of the blank(s) were qualified as estimated, "J/UJ", due to possible low bias. The following samples were qualified:

Analyte	Associated Samples
silver	All
copper	MJ0F17, MJ0FK9, MJ0GN9

ICP-AES Interference Check Sample - Acceptable

The ICP-AES interference check samples (ICS) were analyzed to verify inter-element and background correction factors. The frequency of analysis (beginning and end of sequence) and recovery criteria (80-120%) were met by all of the ICS analyzed. The recoveries ranged from 82-119%. None of the data were qualified on this basis.

ICP-AES Serial Dilution Analysis

Sample MJ0GL0 was analyzed for serial dilution. All of the analytes which exceeded the minimum concentration criterion (50 times the IDL) agreed within 10% difference with the exception of potassium. Results for potassium in all samples were qualified as estimated, "J". The "E" qualifiers applied by the laboratory were crossed-out by the reviewer.

Laboratory Control Sample - Acceptable

The frequency of analysis and the recovery criteria for the laboratory control sample was met. The recoveries ranged from 98-114%. None of the data were qualified on this basis.

Duplicate Sample Analysis - Acceptable

Sample MJ0GL0 was utilized for duplicate analysis. The duplicate results met the frequency of analysis and method control limit criteria for all target analytes. None of the data were qualified on this basis.

Matrix Spike Analysis - Acceptable

Sample MJ0GL0 was used for the spike analysis. The frequency of analysis and recovery criteria were met. All of the spike recoveries were acceptable and ranged from 90-103%. None of the data were qualified on this basis.

Laboratory Contact

The laboratory was not contacted for this review.

Overall Assessment

The total number of data points was 230. Fifteen (6.5%) were qualified as non-detect due to blank contamination. Twenty three (10%) were qualified as estimated due to negative blanks and ICP serial dilution analysis.

All of the samples were analyzed in accordance with technical specifications outlined in the SOW. The data, as qualified, are acceptable and can be used for all purposes.

DATA QUALIFIERS

U	-	The analyte was not detected at or above the reported result.
J	-	The analyte was positively identified. The associated numerical result is an estimate.
R	-	The data are unusable for all purposes.
N	-	There is evidence the analyte is present in this sample.
NJ	-	There is evidence that the analyte is present. The associated numerical result is an estimate.
UJ	-	The analyte was not detected at or above the reported estimated result. The associated numerical value is an estimate of the quantitation limit of the analyte in this sample.
L	-	Low bias.
H	-	High bias.
Q	-	The result is estimated because the concentration is below the Contract Required Quantitation Limits (CRQLs).
K	-	Unknown Bias.

10
INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0GL0

ICP ID Number: P3 Date: 04/15/01

Flame AA ID Number:

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum	308.20		200	68.2	P
Antimony	206.80		60	2.5	P
Arsenic	189.00		10	2.6	P
Barium	493.40		200	0.7	P
Beryllium	313.00		5	0.3	P
Cadmium	226.50		5	0.6	P
Calcium	317.90		5000	25.6	P
Chromium	267.70		10	0.6	P
Cobalt	228.60		50	1.0	P
Copper	324.70		25	1.0	P
Iron	271.40		100	14.6	P
Lead	220.30		3	2.8	P
Magnesium	279.00		5000	27.0	P
Manganese	257.60		15	0.3	P
Mercury			0.2		NR
Nickel	231.60		40	1.1	P
Potassium	766.40		5000	11.7	P
Selenium	196.00		5	2.0	P
Silver	328.00		10	0.5	P
Sodium	330.20		5000	474.3	P
Thallium	190.80		10	3.4	P
Vanadium	292.40		50	1.0	P
Zinc	206.20		20	0.6	P
Cyanide			10		NR

Comments:
P3: THERM0 JARRELL ASH

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0GL0

ICP ID Number: Date: 04/15/01

Flame AA ID Number: C5

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		NR
Antimony			60		NR
Arsenic			10		NR
Barium			200		NR
Beryllium			5		NR
Cadmium			5		NR
Calcium			5000		NR
Chromium			10		NR
Cobalt			50		NR
Copper			25		NR
Iron			100		NR
Lead			3		NR
Magnesium			5000		NR
Manganese			15		NR
Mercury	253.70		0.2	0.1	CV
Nickel			40		NR
Potassium			5000		NR
Selenium			5		NR
Silver			10		NR
Sodium			5000		NR
Thallium			10		NR
Vanadium			50		NR
Zinc			20		NR
Cyanide			10		NR

Comments:

C5: CETAC M6000

13
PREPARATION LOG

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0GL0

Method: P

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
LCSW	07/10/01		50
MJ0F17	07/10/01		50
MJ0FK9	07/10/01		50
MJ0GL0	07/10/01		50
MJ0GL0D	07/10/01		50
MJ0GL0S	07/10/01		50
MJ0GL9	07/10/01		50
MJ0GM1	07/10/01		50
MJ0GM4	07/10/01		50
MJ0GM6	07/10/01		50
MJ0GM8	07/10/01		50
MJ0GN8	07/10/01		50
MJ0GN9	07/10/01		50
PBW	07/10/01		50

13
PREPARATION LOG

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0GL0

Method: CV

EPA Sample No.	Preparation Date	Weight (gram)	Volume (mL)
MJ0F17	07/10/01		100
MJ0FK9	07/10/01		100
MJ0GL0	07/10/01		100
MJ0GL0D	07/10/01		100
MJ0GL0S	07/10/01		100
MJ0GL9	07/10/01		100
MJ0GM1	07/10/01		100
MJ0GM4	07/10/01		100
MJ0GM6	07/10/01		100
MJ0GM8	07/10/01		100
MJ0GN8	07/10/01		100
MJ0GN9	07/10/01		100
PBW	07/10/01		100

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0F17

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0GL0

Matrix (soil/water): WATER Lab Sample ID: 39293S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	114	B		P
7440-36-0	Antimony	2.5	U		P
7440-38-2	Arsenic	2.6	U		P
7440-39-3	Barium	20.8	B		P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	1.3	B		P
7440-70-2	Calcium	18900			P
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt	1.0	U		P
7440-50-8	Copper	1.0	U	UJK	P
7439-89-6	Iron	14.6	U		P
7439-92-1	Lead	3.0	B		P
7439-95-4	Magnesium	9530			P
7439-96-5	Manganese	0.75	B		P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	1.1	U		P
7440-09-7	Potassium	740	B	~~UJK~~	P
7782-49-2	Selenium	2.0	U		P
7440-22-4	Silver	0.50	U	UJK	P
7440-23-5	Sodium	3000	B	U	P
7440-28-0	Thallium	3.4	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	102			P
	Cyanide				NR

CF 8-3-01

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0FK9

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0GL0

Matrix (soil/water): WATER Lab Sample ID: 39294S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	134	B		P
7440-36-0	Antimony	2.5	U		P
7440-38-2	Arsenic	2.6	U		P
7440-39-3	Barium	54.3	B		P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	0.87	B		P
7440-70-2	Calcium	137000			P
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt	1.0	U		P
7440-50-8	Copper	1.2	B	JL	P
7439-89-6	Iron	82.1	B	U	P
7439-92-1	Lead	21.5			P
7439-95-4	Magnesium	46400			P
7439-96-5	Manganese	1.1	B		P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	8.4	B		P
7440-09-7	Potassium	2290	B	EJL	P
7782-49-2	Selenium	2.0	U		P
7440-22-4	Silver	0.50	U	UJK	P
7440-23-5	Sodium	2990	B	U	P
7440-28-0	Thallium	3.4	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	117			P
	Cyanide				NR

8-3-01

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0GL0

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0GL0

Matrix (soil/water): WATER Lab Sample ID: 39253S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	105	B		P
7440-36-0	Antimony	2.5	U		P
7440-38-2	Arsenic	5.8	B		P
7440-39-3	Barium	71.6	B		P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	0.66	B		P
7440-70-2	Calcium	48500			P
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt	1.0	U		P
7440-50-8	Copper	2.2	B		P
7439-89-6	Iron	71.3	B	U	P
7439-92-1	Lead	8.7			P
7439-95-4	Magnesium	30200			P
7439-96-5	Manganese	0.43	B		P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	4.6	B		P
7440-09-7	Potassium	1170	B	~~J~~ FLAG	P
7782-49-2	Selenium	2.0	U		P
7440-22-4	Silver	0.50	U	UJK	P
7440-23-5	Sodium	2460	~~B~~	U	P
7440-28-0	Thallium	3.4	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	212			P
_____	Cyanide				NR

CF 8-3-01

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0GL9

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0GL0

Matrix (soil/water): WATER Lab Sample ID: 39254S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	125	B		P
7440-36-0	Antimony	2.5	U		P
7440-38-2	Arsenic	2.6	U		P
7440-39-3	Barium	58.5	B		P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	89400			P
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt	1.0	U		P
7440-50-8	Copper	1.2	B		P
7439-89-6	Iron	409			P
7439-92-1	Lead	9.3			P
7439-95-4	Magnesium	29000			P
7439-96-5	Manganese	33.0			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	1.1	U		P
7440-09-7	Potassium	2540	B	~~J~~ JL	P
7782-49-2	Selenium	2.0	U		P
7440-22-4	Silver	0.50	U	UJK	P
7440-23-5	Sodium	2570	~~B~~	U	P
7440-28-0	Thallium	3.4	B		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	62.5			P
	Cyanide				NR

CP 8-3-01

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

60

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0GM1

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0GL0

Matrix (soil/water): WATER Lab Sample ID: 39256S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	150	B		P
7440-36-0	Antimony	2.5	U		P
7440-38-2	Arsenic	2.6	U		P
7440-39-3	Barium	62.6	B		P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	20100			P
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt	1.0	U		P
7440-50-8	Copper	1.0	U		P
7439-89-6	Iron	107			P
7439-92-1	Lead	2.8	U		P
7439-95-4	Magnesium	5230			P
7439-96-5	Manganese	10	B		P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	1.1	U		P
7440-09-7	Potassium	873	B	~~J~~ UJ	P
7782-49-2	Selenium	2.0	U		P
7440-22-4	Silver	0.50	U	UJK	P
7440-23-5	Sodium	4340	~~B~~ U		P
7440-28-0	Thallium	3.4	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	4.4	B		P
	Cyanide				NR

CP 8-3-01

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0GM4

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0GL0

Matrix (soil/water): WATER Lab Sample ID: 39257S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	156	B		P
7440-36-0	Antimony	2.5	U		P
7440-38-2	Arsenic	2.6	U		P
7440-39-3	Barium	58.2	B		P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	18300			P
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt	1.0	U		P
7440-50-8	Copper	1.0	U		P
7439-89-6	Iron	103			P
7439-92-1	Lead	2.8	U		P
7439-95-4	Magnesium	4840	B		P
7439-96-5	Manganese	11.1	B		P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	1.1	U		P
7440-09-7	Potassium	799	B	#JL	P
7782-49-2	Selenium	2.0	U		P
7440-22-4	Silver	0.50	U	UJK	P
7440-23-5	Sodium	2730	B	U	P
7440-28-0	Thallium	3.4	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	5.5	B		P
_____	Cyanide				NR

JL 8-3-01

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0GM6

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0GL0

Matrix (soil/water): WATER Lab Sample ID: 39255S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	245			P
7440-36-0	Antimony	2.5	U		P
7440-38-2	Arsenic	2.6	U		P
7440-39-3	Barium	62.5	B		P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	18800			P
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt	1.0	U		P
7440-50-8	Copper	1.5	B		P
7439-89-6	Iron	273			P
7439-92-1	Lead	4.1			P
7439-95-4	Magnesium	5020			P
7439-96-5	Manganese	25.5			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	1.1	U		P
7440-09-7	Potassium	846	B	EJL	P
7782-49-2	Selenium	2.0	U		P
7440-22-4	Silver	0.59	B	JL	P
7440-23-5	Sodium	3900	B	U	P
7440-28-0	Thallium	3.4	U		P
7440-62-2	Vanadium	1.0	B		P
7440-66-6	Zinc	20.6			P
	Cyanide				NR

CP 8-3-01

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0GM8

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0GL0

Matrix (soil/water): WATER Lab Sample ID: 39258S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	104	B		P
7440-36-0	Antimony	2.5	U		P
7440-38-2	Arsenic	2.6	U		P
7440-39-3	Barium	57.3	B		P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	18700			P
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt	1.0	U		P
7440-50-8	Copper	1.3	B		P
7439-89-6	Iron	53.7	B	U	P
7439-92-1	Lead	2.8	U		P
7439-95-4	Magnesium	4950	B		P
7439-96-5	Manganese	7.7	B		P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	1.1	U		P
7440-09-7	Potassium	792	B	UJK	P
7782-49-2	Selenium	2.0	U		P
7440-22-4	Silver	0.50	U	UJK	P
7440-23-5	Sodium	4160	B	U	P
7440-28-0	Thallium	3.4	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	2.8	B		P
	Cyanide				NR

CP 8-3-01

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0GN8

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0GL0

Matrix (soil/water): WATER Lab Sample ID: 39259S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	112	B		P
7440-36-0	Antimony	2.5	U		P
7440-38-2	Arsenic	2.6	U		P
7440-39-3	Barium	13.2	B		P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	24500			P
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt	1.0	U		P
7440-50-8	Copper	1.0	U		P
7439-89-6	Iron	44.4	B U		P
7439-92-1	Lead	2.8	U		P
7439-95-4	Magnesium	8900			P
7439-96-5	Manganese	6.0	B		P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	1.1	U		P
7440-09-7	Potassium	792	B	J	P
7782-49-2	Selenium	2.0	U		P
7440-22-4	Silver	0.50	U	UJK	P
7440-23-5	Sodium	2200	B U		P
7440-28-0	Thallium	3.4	U		P
7440-62-2	Vanadium	1.0	U		P
7440-66-6	Zinc	3.9	B		P
	Cyanide				NR

CF 8-3-01

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0GN9

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0GL0

Matrix (soil/water): WATER Lab Sample ID: 39260S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 0.0

Concentration Units (ug/L or mg/Kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	149	B		P
7440-36-0	Antimony	2.5	U		P
7440-38-2	Arsenic	2.6	U		P
7440-39-3	Barium	14.7	B		P
7440-41-7	Beryllium	0.30	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	27300			P
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt	1.0	U		P
7440-50-8	Copper	1.0	U	UJK	P
7439-89-6	Iron	34.8	B	U	P
7439-92-1	Lead	2.8	U		P
7439-95-4	Magnesium	9560			P
7439-96-5	Manganese	3.7	B		P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	1.1	U		P
7440-09-7	Potassium	889	B	UJK	P
7782-49-2	Selenium	2.0	U		P
7440-22-4	Silver	0.50	U	UJK	P
7440-23-5	Sodium	2790	B	U	P
7440-28-0	Thallium	3.4	U		P
7440-62-2	Vanadium	1.6	B		P
7440-66-6	Zinc	0.65	B		P
	Cyanide				NR

CP 8-3-01

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

MEMORANDUM

DATE: November 6, 2001

TO: Leatta Dahlhoff, Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, Chemist, E & E, Seattle, WA

SUBJ: **Inorganic Data Summary Check, Upper Columbia River Mines/Mills ESI, Stevens and Pend Oreille Counties, Washington**

REF: TDD: 01-02-0028 PAN: 001281.0073.01SR

The data quality summary check of 3 water and 11 solid samples collected from the Upper Columbia River Mines/Mills ESI, Stevens and Pend Oreille Counties, Washington has been completed. Target Analyte List metals analysis (EPA CLP SOW ILM04.1) was performed by Sentinel, Inc., Huntsville, Alabama.

The samples were numbered:

MJ0KD3	MJ0KK0	MJ0KK3	MJ0KK6	MJ0KK9	MJ0KH1
MJ0KK1	MJ0KK4	MJ0KK7	MJ0KL0	MJ0KH6	MJ0KK2
MJ0KK5	MJ0KK8				

The following discrepancy was noted:

Sample MJ0KK6 was identified as MJ0KK4 in the last section of the memorandum; sample qualifications were applied correctly, therefore no action was taken.

All sample results originally qualified "B" by the laboratory to indicate a result less than the CRDL were changed to "JBK" by the secondary reviewer to indicate an estimated quantity less than the CRDL with an unknown bias.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

IN REPLY
REFER TO: OEA-095 November 1, 2001

MEMORANDUM

SUBJECT: Upper Columbia River/ESI Mines and Mills, CLP Metals Analysis, Data Validation
Case: 29730
SDG: MJ0KD3

FROM: Laura Castrilli, Chemist
Quality Assurance and Data Unit, OEA

TO: Monica Tonel, Site Assessment Manager
Office of Environmental Cleanup

CC: Bruce Woods, Region 10 CLP TPO
Mark Woodke, Ecology and Environment Inc.

The following is a validation of ICP-AES and mercury analyses of eleven soil/sediment and three water samples from the Upper Columbia River/ESI Mines and Mills site. The analyses were performed following the USEPA Contract Laboratory Program Statement of Work for Inorganics Analysis Multi-media, Multi-Concentration, ILM04.1. Analyses were conducted by Sentinel, Inc., Huntsville, Alabama. This validation was conducted for the following samples:

MJ0KD3	MJ0KK0	MJ0KK3	MJ0KK6	MJ0KK9
MJ0KH1	MJ0KK1	MJ0KK4	MJ0KK7	MJ0KL0
MJ0KH6	MJ0KK2	MJ0KK5	MJ0KK8	

Data Qualifications

The following comments refer to the Sentinel Laboratory's performance in meeting quality control specifications outlined in the *CLP Statement of Work (CLP-SOW) for Inorganic Analysis, rev. ILM04.1*. The comments presented herein are based on the information provided for the review.

1.0 Timeliness - Acceptable

The technical (40 CFR part 136) holding time from the date of collection for mercury in water is 28 days. The holding time for the remaining metals in water is 180 days. The samples were collected between 09/10/01 and 09/13/01. ICP-AES analyses were completed

between 09/27/01 and 10/02/01. Mercury analyses were completed on 09/25/01.

All analyses were conducted within the technical water holding times, therefore no qualification was made based on holding time.

2.0 Sample Preparation - Acceptable

The samples were prepared for mercury and ICP-AES analyses on 09/25/01. No qualification was made based on sample preparation.

3.0 Calibrations/Calibration Verifications -

The samples were analyzed for mercury by CVAAS on 09/25/01. The initial calibration included one blank and six standards. The curve was linear with a correlation coefficient greater than 0.995.

The samples were analyzed by ICP-AES on 09/27/01 (most analytes), 09/28/01 (re-analysis for copper and/or lead for samples affected by poor continuing calibration verification recovery or interference check sample recovery) and 10/02/01 (dilution analysis for copper in sample MJ0KK1). The instruments were standardized each day of analysis according to the analytical method using one blank and a single calibration standard for each element.

All ICP-AES and CVAAS (mercury) calibrations were performed as required and met the acceptance criteria; therefore, no qualification was made on this basis.

Calibration verification samples are required before and after sample analysis and after every 10 samples during analysis. Mercury recoveries must be within 80-120%. Other metal recoveries must be within 90-110%.

All ICP-AES and CVAAS (mercury) calibration verification (initial and continuing) samples bracketing reported sample results met the frequency and recovery criteria; with the exception of sodium and silver in the final CCV for the primary 09/28/01 analysis. Since both recoveries (each were 89.7%R), were so close to the acceptance criteria, no qualification was made based on ICP-AES or CVAAS calibration verification.

There was one instance of a calibration verification (CCV)/calibration blank (CCB) pair being ran after a 1.5 hour break in analysis. Since the only affected sample analyses were for the duplicate, matrix spike and post spike analyses for soil/sediment sample MJ0KK3 (the results of which compared favorably with the earlier native analysis for this sample), and since the affected analyses were immediately preceded by an acceptable CCV/CCB pair, no qualification was made based on the break in analysis/long time between CCV/CCBs.

4.0 Laboratory Control Samples - Acceptable

Laboratory Control samples (LCS) are digested and analyzed along with the samples to verify the efficiency of laboratory procedures (LCS analyses are not required for mercury in water). All recoveries associated with reported sample results met the acceptance criteria for control samples, therefore no qualification was made based on LCS results.

5.0 Blanks -

Procedural blanks were prepared with the samples to show potential contamination from the digestion or analytical procedure. If an analyte was found in the associated blank, the sample results were qualified if the analyte concentration was less than five times the analytical value in the blank.

Aluminum, barium, calcium, copper, iron, magnesium, manganese, potassium, silver, and zinc were detected in the water preparation blank. Calcium and potassium were detected in the soil/sediment preparation blank. Aluminum, barium, calcium, chromium, iron, magnesium, manganese, and silver were detected in one or more continuing calibration blanks (CCBs). Beryllium, magnesium, and sodium in one or more CCBs had negative values with absolute values greater than the detection limits.

Based on blank contamination, the following qualifications were made:

- aluminum in sample MJ0KH6 was qualified 'U', undetected
- beryllium in samples MJ0KK4 and MJ0KL0 was qualified 'J', estimated
- chromium in sample MJ0KH1 was qualified 'U', undetected
- copper in sample MJ0KH6 was qualified 'U', undetected
- manganese in sample MJ0KH6 was qualified 'U', undetected
- silver in samples MJ0KH1 and MJ0KK5 was qualified 'U', undetected

The remaining sample results were greater than five times the associated blank levels (or were already undetected) and were not qualified on this basis.

6.0 ICP-AES Interference Check Sample -

The interference check sample (ICS) is analyzed by ICP-AES to verify interelement and background correction factors. Analysis is required at the beginning and end of each sample analysis run and recoveries must be between 80% and 120%. All ICS recoveries associated with

reported sample results were within the recovery criterion.

The raw data for a number of samples had interfering levels of calcium, magnesium, and/or iron. Analytes for which iron is an interferent were qualified as follows:

- Cadmium in sample MJ0KD3 was qualified 'UJ' estimated detection limit (possible false negative).

7.0 Duplicate Analysis -

Duplicate analysis was done on water sample MJ0KH6. Water duplicate results were within the ±20% Relative Percent Difference (RPD) or ±CRDL criteria for water results < 5 times the CRDL criteria; with the exception of iron (outside the CRDL criteria). All water iron results were qualified 'J' estimated.

Duplicate analysis was done on soil/sediment sample MJ0KK3. Soil/sediment duplicate results were within the ±35% Relative Percent Difference (RPD) or ±2xCRDL criteria for soil/sediment results < 5 times the CRDL criteria; therefore no qualification was made on this basis.

Laboratory '*' qualifiers were removed from soil/sediment arsenic results as the laboratory used the stricter water criteria to qualify soil/sediment results.

8.0 Matrix Spike Analysis -

Matrix spike sample analyses are done to provide information about the effect of the sample matrix on digestion and measurement methods. Matrix spike recovery must be within the limits of 75 - 125%.

Matrix spike analysis was done on water sample MJ0KH6. All soil/sediment matrix spike recoveries were within the required QC limits; therefore water results were not qualified based on matrix spike recovery.

Matrix spike analysis was done on soil/sediment sample MJ0KK3. All soil/sediment matrix spike recoveries were within the required QC limits; with the exception of antimony (64%R) and arsenic (45.2%). All antimony and arsenic soil/sediment results were qualified 'J', estimated (low bias suspected for samples not qualified for other reasons).

9.0 ICP-AES Serial Dilution -

Water sample MJ0KH6 and soil/sediment sample MJ0KK3 were analyzed by ICP-AES serial dilution to check for potential interferences. All of the analytes which exceeded the minimum concentration criterion (50 times the IDL) were within the 10%D criteria; with the exception of

potassium in water (27.7%D) and calcium in soil/sediment (11.7%D). All water potassium results were qualified 'J', estimated. All soil/sediment calcium results were qualified 'J', estimated (unknown bias).

10.0 Detection Limits - Acceptable

Sample results which fall below the instrument detection limit (IDL) are assigned the value of the instrument detection limit and the 'U' qualifier is attached.

Contract Required Detection Limit (CRDL) standards are required for most analytes to demonstrate a linear calibration curve near the CRDL. CRDL standards were run at the required frequency.

11.0 Overall Assessment of the Data

This validation of the data is based on the criteria outlined in the *National Functional Guidelines for Inorganic Data Review (02/94).*

The sample cooler(s) had a temperature upon receipt of 9°C. According to the sample receipt log book, all applicable pHs were within specific guidelines. Properly preserved water metals samples (pH<2) do not require cooling (40 CFR 136.2, Table II). In the reviewer's judgement, it is unlikely that the elevated temperature for soil/sediment would cause appreciable loss of metals, therefore no action was taken based on the elevated cooler temperature.

Soil/sediment sample MJ0KK4 had a very low percent solids - 19.1. The raw data was checked to make sure there wasn't a calculation error. There was no calculation error.

For soil/sediment the amount of each sample analyzed for mercury is 0.2 g, wet weight, while the amount of each sample analyzed for other metals is 1.0 gram, wet weight. With 19.1%, this means only approximately 0.038 g of solid material was analyzed for mercury and approximately 0.191 g of solid material was analyzed for the other metals. Since mercury was not detected in this sample and since such a minute amount of material was digested, the undetected mercury result for samples MJ0KK6 was qualified 'R', unusable. There were a number of detects for the ICP-AES analysis, indicating that at least some ICP analytes were measurable in the small sample aliquot. All ICP-AES analytes, including non-detects, in samples MJ0KK6 was qualified 'J', estimated (unknown bias).

There were 322 data points reported: 8 results were qualified due to blank contamination; 22 results were estimated due to matrix spike recovery; 3 results were estimated due to duplicate precision; 14 results were estimated due to serial dilution; 1 result was suspected to be a possible false negative due to high iron; 22 results were estimated due to reduced sample aliquot size; 1 result was rejected

due to extremely reduced sample aliquot size. Overall, 20.5 percent of the data was qualified (only counting one qualification per data point for those results qualified for more than one reason).

Below are the definitions for the National Functional Guidelines for Inorganic Data Review (02/94) qualifiers used when validating/qualifying data from Inorganic analysis.

DATA QUALIFIERS

U - The material was analyzed for, but was not detected above the level of the associated value. The associated value is either the sample quantitation limit or the sample detection limit.

J - The associated value is an estimated quantity.

R - The data are unusable. (Note: Analyte may or may not be present.)

UJ - The material was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.

At the request of the site assessment manager, bias for the data was qualitatively assessed and if applicable, the following additional qualifiers were applied:

L - Low bias.

H - High bias.

K - Unknown Bias.

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0KK8

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29730 SAS No.: SDG No.: MJ0KD3

Matrix (soil/water): SOIL Lab Sample ID: 40930S

Level (low/med): LOW Date Received: 09/19/01

% Solids: 54.3

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7980			P
7440-36-0	Antimony	1.1	U	~~N~~ J	P
7440-38-2	Arsenic	3.5	B	~~N*~~ J	P
7440-39-3	Barium	114			P
7440-41-7	Beryllium	0.27	B		P
7440-43-9	Cadmium	0.07	U		P
7440-70-2	Calcium	11900		~~E~~ J	P
7440-47-3	Chromium	11.0			P
7440-48-4	Cobalt	5.0	B		P
7440-50-8	Copper	10.2			P
7439-89-6	Iron	13500			P
7439-92-1	Lead	12.9			P
7439-95-4	Magnesium	6010			P
7439-96-5	Manganese	252			P
7439-97-6	Mercury	0.09	U		CV
7440-02-0	Nickel	10.8	B		P
7440-09-7	Potassium	1370	B		P
7782-49-2	Selenium	1.3	U		P
7440-22-4	Silver	0.83	B		P
7440-23-5	Sodium	272	B		P
7440-28-0	Thallium	1.9	U		P
7440-62-2	Vanadium	17.4	B		P
7440-66-6	Zinc	52.5			P
	Cyanide				NR

11/01/01

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

ecology and environment, inc.
International Specialists in the Environment
2101 Fourth Avenue, Suite 1900, Seattle, WA 98121
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: August 22, 2001

TO: Leatta Dahlhoff, Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, Chemist, E & E, Seattle, WA

SUBJ: **Inorganic Data Quality Assurance Summary Check, Upper Columbia River Stevens and Pend Oreille Counties, Washington**

REF: TDD: 01-02-0028 PAN: 001281.0073.01SR

The data quality assurance summary review of 211 soil and 24 water samples collected from the Upper Columbia River in Stevens and Pend Oreille Counties, Washington, has been completed. These samples were analyzed for inorganic target elements and cyanide in accordance with the USEPA Contract Laboratory Program (CLP) Statement of Work (SOW) for Inorganic Analyses (ILM04.0) by Sentinel, Inc. of Huntsville, AL.

The following discrepancies were noted:

In case number 29440, sample delivery group MJ0EQ5, lead was not qualified as "U" on the Forms Is as listed in the memo in the blanks section. The secondary reviewer added the "U" qualifier.

In case number 29440, sample delivery group MJ0GL0, sample MJ0GN9 was listed twice for iron in the blank section. The primary reviewer corrected the memo to list MJ0GN8 and MJ0GN9. Only the narrative requires editing.

The "B" flag indicates that the reported concentration is between the instrument detection limit (IDL) and contract required detection limit (CRDL).

All discrepancies were reported to Ms. Gina Grepo-Grove, TOPO, USEPA, Region 10 on August 22, 2001. The narrative was corrected by the primary reviewer.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

August 15, 2001

Reply To
Attn Of: OEA-095

MEMORANDUM

Subject: Data Validation Report for the Total Inorganic Analyses of Samples from Upper Columbia River/Lake Roosevelt Expanded Site Assessment
Case: 29440 SDGs: MJ0GL0, MJ0EQ5, MJ0GG6, MJ0ES7, MJ0FK6, MJ0FJ0, MJ0EW6, MJ0GE0, MJ0GJ5, MJ0GM7, MJ0EQ6, MJ0EN5, MJ0EY7,

From: Gina Grepo-Grove, Chemist
Quality Assurance & Data Unit, OEA

To: Monica Tonel, SAM, ECL

CC: Bruce Woods, Region 10 CLP TPO
Leatta Dahlhoff, Ecology & Environment

The quality assurance (QA) review of 211 soil and 24 water samples collected from the above referenced site has been completed. These samples were analyzed for full inorganic target compounds in accordance with the USEPA Contract Laboratory Program (CLP) Statement of Work (SOW) for Inorganic Analyses (revision ILM04.1). The analyses were performed by Sentinel, Inc of Huntsville, AL. The data validations were performed by the Environmental Services Assistance Team (ESAT) of the USEPA Manchester Environmental Laboratory, Port Orchard, WA.

There were no significant problems encountered with the data. A total of 5405 data points were reviewed and evaluated. Approximately 0.35% of the total data points were qualified as unusable due to extremely low matrix recoveries. Approximately 17% of the total data points were qualified as estimated due to serial dilution results, contamination in the blanks and/or poor matrix spike recoveries. Additional 2.9% of the total data points were qualified as non-detects due to contamination in the blank. All of the samples were analyzed in accordance with the technical requirements specified in the SOW. Data as qualified can be used for all purposes.

Attached are the validation memos for the above mentioned case and sample delivery groups (SDGs).

ENVIRONMENTAL SERVICES ASSISTANCE TEAM

ESAT Region 10
7411 Beach Drive East
Port Orchard, WA 98366
Phone (360) 871-8723

DELIVERABLE NARRATIVE

DATE: August 6, 2001

To: Ginna Grepo-Grove, TOPO, USEPA, Region 10

THROUGH: Dave Dobb, Team Manager, ESAT Region 10 CMC for DD.

FROM: Chris Pace, Data Validation Task Lead, ESAT Region 10 CP

SUBJECT: Data Validation Report for the Inorganic Analysis of Samples from the Upper Columbia River Lake Roosevelt/Mines Sites. Case: 29440 SDG: MJ0EY7

Account Code: 01T10P50102D106XLA00

Doc. #: ES10-0-1127
TDN: 1048
Task Order: 001
Contract: 68-W-01-027

CC: Gerald Dodo, PO, USEPA, Region 10
Project File

The quality assurance (QA) review of 20 soil samples collected from the above referenced site has been completed. These samples were analyzed for total metals by Sentinel, Inc. of Huntsville, AL. The following samples were reviewed in this validation report:

MJ0EY7	MJ0EZ2	MJ0GL3	MJ0GL8
MJ0EY8	MJ0EZ3	MJ0GL4	MJ0GM0
MJ0EY9	MJ0F12	MJ0GL5	MJ0GM2
MJ0EZ0	MJ0GL1	MJ0GL6	MJ0GM3
MJ0EZ1	MJ0GL2	MJ0GL7	MJ0GM5

DATA QUALIFICATIONS

The following comments refer to the laboratory performance in meeting the Quality Control Specifications outlined in the Contract Laboratory Program (CLP) Statement of Work (SOW) for Inorganic Analysis (ILM04.1) and the USEPA CLP Functional Guidelines for Inorganic Data Review, 2/94.

The conclusions presented herein are based on the information provided for the review.

Holding Time - Acceptable

The suggested holding time for mercury is 28 days from the date of sample collection and the holding time for the rest of the metals is 180 days. The samples were collected on 6/23, 6/25, 6/26 and 6/27/01. The samples were analyzed for mercury within 19 days and all other metals within 24 days of the sample collection date. None of the data were qualified on this basis.

Sample Preparation - Acceptable

The samples were prepared in accordance with the methods used. None of the data were qualified on this basis.

Initial Calibration - Acceptable

All of the samples were analyzed for total mercury using Cold Vapor Atomic Absorption Spectroscopy (CVAAS). The initial calibration for mercury met the frequency of analysis and the linearity criteria (correlation coefficients, r=>0.995).

The rest of the target analytes were analyzed using Inductively Coupled Plasma-Atomic Emission Spectroscopy (ICP-AES). The initial calibration for ICP-AES met the frequency of analysis and the linearity criteria (correlation coefficients, r=>0.995).

None of the data were qualified on this basis.

Calibration Verification - Acceptable

The initial and continuing calibration verifications met the criteria for frequency of analysis and recovery criteria of 90-110% and 80-120% for mercury. The recoveries ranged from 92-107% for ICP-AES and from 85-97% for mercury. None of the data were qualified on this basis.

Detection Limits - Acceptable

All of the target analytes met the project required quantitation limits. All of the Contract Required Detection Limit (CRDL) checks met the frequency of analysis and recovery criteria.

Blanks

Procedural blanks were prepared with the samples to indicate potential contamination from the digestion or analytical procedure. If an analyte was found in the associated blank, the sample results were qualified as non-detects, "U", if the analyte concentration is less than five times the analytical value in the blank.

The frequency of analysis of blanks was met. Based on the target analytes detected in the procedural, initial and continuing calibration blanks, the following results were qualified as non-detects, "U":

Analyte	Associated Samples
cadmium	MJ0EY9, MJ0GL3, MJ0GL8, MJ0GM2, MJ0GM5
sodium	MJ0EY8
silver	MJ0EY7, MJ0EY8, MJ0EY9, MJ0EZ0, MJ0EZ1, MJ0EZ2, MJ0EZ3, MJ0GL8, MJ0GM0, MJ0GM2, MJ0GM3, MJ0GM5

Analytes which yielded a negative response in the preparation blank and/or continuing calibration blank(s) at concentrations comparable to or less than the absolute value of the blank(s) were qualified as estimated, "J/UJ", due to possible low bias. The following samples were qualified:

Analyte	Associated Samples
selenium	All

ICP-AES Interference Check Sample - Acceptable

The ICP-AES interference check samples (ICS) were analyzed to verify inter-element and background correction factors. The frequency of analysis (beginning and end of sequence) and recovery criteria (80-120%) were met. The recoveries ranged from 91-118%. None of the data were qualified on this basis.

ICP-AES Serial Dilution Analysis

Sample MJ0EY9 was analyzed for serial dilution. All of the analytes which exceeded the minimum concentration criterion (50 times the IDL) agreed within 10% difference with the exception of calcium and magnesium. Results for calcium and magnesium in all samples were qualified as estimated, "J". The "E" qualifiers applied by the laboratory were crossed-out by the reviewer.

Laboratory Control Sample - Acceptable

The frequency of analysis and the recovery criteria for the laboratory control sample was met. The recoveries ranged from 64-172%. None of the data were qualified on this basis.

Duplicate Sample Analysis - Acceptable

Sample MJ0EY9 was utilized for duplicate analysis. The duplicate results met the frequency of analysis and method control limit criteria (±20% RPD or ± CRDL) for all target analytes with the exception of zinc. Zinc did meet the suggested technical control limit criteria (±35% RPD or ± 2X CRDL) for soils. The "*" qualifiers applied by the laboratory were crossed-out by the reviewer. None of the data were qualified on this basis.

Matrix Spike Analysis

Sample MJ0EY9 was used for the spike analysis. The frequency of analysis and recovery criteria were met with the exception of manganese (126%) and selenium (67%) in the spike sample MJ0EY9S. Due to possible bias, the detected and non-detected selenium results in all samples were qualified as estimated, "J/UJ". Due to possible bias, the detected manganese results in all samples were qualified as estimated, "J". The "N" qualifiers applied by the laboratory were crossed-out by the reviewer. All of the other spike recoveries were acceptable and ranged from 80-104%.

Laboratory Contact

The laboratory was not contacted for this review.

Overall Assessment

The total number of data points was 460. Eighteen (3.9%) were qualified as non-detected due to blank contamination. Eighty (17%) were qualified as estimated due to negative blanks, ICP serial dilution and spike analyses.

All of the samples were analyzed in accordance with technical specifications outlined in the SOW. The data, as qualified, are acceptable and can be used for all purposes.

DATA QUALIFIERS

U	-	The analyte was not detected at or above the reported result.
J	-	The analyte was positively identified. The associated numerical result is an estimate.
R	-	The data are unusable for all purposes.
N	-	There is evidence the analyte is present in this sample.
NJ	-	There is evidence that the analyte is present. The associated numerical result is an estimate.
UJ	-	The analyte was not detected at or above the reported estimated result. The associated numerical value is an estimate of the quantitation limit of the analyte in this sample.
L	-	Low bias.
H	-	High bias.
Q	-	The result is estimated because the concentration is below the Contract Required Quantitation Limits (CRQLs).
K	-	Unknown Bias.

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0GL1

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0EY7

Matrix (soil/water): SOIL Lab Sample ID: 39261S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 78.5

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	10700			P
7440-36-0	Antimony	1.2	B		P
7440-38-2	Arsenic	5.8			P
7440-39-3	Barium	123			P
7440-41-7	Beryllium	0.30	B		P
7440-43-9	Cadmium	0.51	B		P
7440-70-2	Calcium	24400		E JL	P
7440-47-3	Chromium	23.9			P
7440-48-4	Cobalt	8.5	B		P
7440-50-8	Copper	32.1			P
7439-89-6	Iron	21700			P
7439-92-1	Lead	28.1			P
7439-95-4	Magnesium	11200		E JL	P
7439-96-5	Manganese	429		N JH	P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	19.2			P
7440-09-7	Potassium	1730			P
7782-49-2	Selenium	0.87	U	N UJK	P
7440-22-4	Silver	0.75	B		P
7440-23-5	Sodium	358	B		P
7440-28-0	Thallium	1.3	U		P
7440-62-2	Vanadium	41.6			P
7440-66-6	Zinc	130		*	P
	Cyanide				NR

up 8-6-01

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0GL2

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0EY7

Matrix (soil/water): SOIL Lab Sample ID: 39262S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 37.9

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2470			P
7440-36-0	Antimony	2.4	B		P
7440-38-2	Arsenic	2.4	U		P
7440-39-3	Barium	105	B		P
7440-41-7	Beryllium	0.07	B		P
7440-43-9	Cadmium	1.3	B		P
7440-70-2	Calcium	206000		E JL	P
7440-47-3	Chromium	57.7			P
7440-48-4	Cobalt	1.3	B		P
7440-50-8	Copper	20.3			P
7439-89-6	Iron	3240			P
7439-92-1	Lead	7.1			P
7439-95-4	Magnesium	3060		E JL	P
7439-96-5	Manganese	93.7		N JH	P
7439-97-6	Mercury	0.13	U		CV
7440-02-0	Nickel	8.0	B		P
7440-09-7	Potassium	333	B		P
7782-49-2	Selenium	4.9		N JL	P
7440-22-4	Silver	0.39	B		P
7440-23-5	Sodium	763	B		P
7440-28-0	Thallium	2.7	U		P
7440-62-2	Vanadium	6.4	B		P
7440-66-6	Zinc	58.2		*	P
	Cyanide				NR

CP 8-6-01

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0GL3

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0EY7

Matrix (soil/water): SOIL Lab Sample ID: 39263S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 76.1

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8410			P
7440-36-0	Antimony	0.82	B		P
7440-38-2	Arsenic	4.9			P
7440-39-3	Barium	85.6			P
7440-41-7	Beryllium	0.24	B		P
7440-43-9	Cadmium	0.09	B	U	P
7440-70-2	Calcium	2350		~~E~~ JL	P
7440-47-3	Chromium	19.7			P
7440-48-4	Cobalt	6.5	B		P
7440-50-8	Copper	23.5			P
7439-89-6	Iron	14400			P
7439-92-1	Lead	9.4			P
7439-95-4	Magnesium	4660		~~E~~ JL	P
7439-96-5	Manganese	217		~~N~~ JH	P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	15.6			P
7440-09-7	Potassium	1340			P
7782-49-2	Selenium	0.88	U	~~N~~ UJK	P
7440-22-4	Silver	0.55	B		P
7440-23-5	Sodium	349	B		P
7440-28-0	Thallium	1.3	U		P
7440-62-2	Vanadium	32.8			P
7440-66-6	Zinc	54.0		~~*~~	P
	Cyanide				NR

JP 8-6-01

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0GL4

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0EY7

Matrix (soil/water): SOIL Lab Sample ID: 39264S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 56.9

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3850			P
7440-36-0	Antimony	2.4	B		P
7440-38-2	Arsenic	5.6			P
7440-39-3	Barium	91.0			P
7440-41-7	Beryllium	0.21	B		P
7440-43-9	Cadmium	6.1			P
7440-70-2	Calcium	59800		≠ JL	P
7440-47-3	Chromium	86.2			P
7440-48-4	Cobalt	4.0	B		P
7440-50-8	Copper	17.7			P
7439-89-6	Iron	9400			P
7439-92-1	Lead	38.7			P
7439-95-4	Magnesium	12100		≠ JL	P
7439-96-5	Manganese	246		≠ JH	P
7439-97-6	Mercury	0.09	U		CV
7440-02-0	Nickel	35.2			P
7440-09-7	Potassium	938	B		P
7782-49-2	Selenium	1.2	U	≠ UJK	P
7440-22-4	Silver	0.52	B		P
7440-23-5	Sodium	462	B		P
7440-28-0	Thallium	1.8	U		P
7440-62-2	Vanadium	42.9			P
7440-66-6	Zinc	342		≠	P
	Cyanide				NR

MP 8-6-01

Color Before: BLACK Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0GL5

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0EY7

Matrix (soil/water): SOIL Lab Sample ID: 39265S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 39.3

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6610			P
7440-36-0	Antimony	2.3	B		P
7440-38-2	Arsenic	16.2			P
7440-39-3	Barium	99.7	B		P
7440-41-7	Beryllium	0.23	B		P
7440-43-9	Cadmium	1.0	B		P
7440-70-2	Calcium	14700		E JL	P
7440-47-3	Chromium	13.8			P
7440-48-4	Cobalt	6.1	B		P
7440-50-8	Copper	16.3			P
7439-89-6	Iron	16200			P
7439-92-1	Lead	23.2			P
7439-95-4	Magnesium	7580		E JL	P
7439-96-5	Manganese	517		M JH	P
7439-97-6	Mercury	0.12	U		CV
7440-02-0	Nickel	22.7			P
7440-09-7	Potassium	1170	B		P
7782-49-2	Selenium	1.7	U	N UJK	P
7440-22-4	Silver	0.75	B		P
7440-23-5	Sodium	669	B		P
7440-28-0	Thallium	2.6	U		P
7440-62-2	Vanadium	33.0			P
7440-66-6	Zinc	163		*	P
	Cyanide				NR

CP 8-6-01

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

INORGANIC ANALYSIS DATA SHEET

EPA SAMPLE NO.

MJ0GL6

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0EY7

Matrix (soil/water): SOIL Lab Sample ID: 39266S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 28.1

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2220			P
7440-36-0	Antimony	2.1	U		P
7440-38-2	Arsenic	3.3	U		P
7440-39-3	Barium	109	B		P
7440-41-7	Beryllium	0.07	U		P
7440-43-9	Cadmium	1.8	B		P
7440-70-2	Calcium	342000		E JL	P
7440-47-3	Chromium	8.2			P
7440-48-4	Cobalt	1.4	B		P
7440-50-8	Copper	15.8	B		P
7439-89-6	Iron	4170			P
7439-92-1	Lead	12.7			P
7439-95-4	Magnesium	5680		E JL	P
7439-96-5	Manganese	217		N JH	P
7439-97-6	Mercury	0.18	U		CV
7440-02-0	Nickel	5.6	B		P
7440-09-7	Potassium	533	B		P
7782-49-2	Selenium	2.4	U	NUJK	P
7440-22-4	Silver	0.21	U		P
7440-23-5	Sodium	975	B		P
7440-28-0	Thallium	3.6	U		P
7440-62-2	Vanadium	8.6	B		P
7440-66-6	Zinc	49.3		+	P
	Cyanide				NR

CP 8-6-01

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0GL7

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0EY7

Matrix (soil/water): SOIL Lab Sample ID: 39267S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 79.3

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3530			P
7440-36-0	Antimony	0.72	U		P
7440-38-2	Arsenic	8.3			P
7440-39-3	Barium	48.1	B		P
7440-41-7	Beryllium	0.18	B		P
7440-43-9	Cadmium	0.40	B		P
7440-70-2	Calcium	49100		E J L	P
7440-47-3	Chromium	7.0			P
7440-48-4	Cobalt	4.6	B		P
7440-50-8	Copper	12.0			P
7439-89-6	Iron	14200			P
7439-92-1	Lead	13.6			P
7439-95-4	Magnesium	27100		E J L	P
7439-96-5	Manganese	209		N J H	P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	20.7			P
7440-09-7	Potassium	990	B		P
7782-49-2	Selenium	0.84	U	N U J K	P
7440-22-4	Silver	0.38	B		P
7440-23-5	Sodium	318	B		P
7440-28-0	Thallium	1.3	U		P
7440-62-2	Vanadium	9.0	B		P
7440-66-6	Zinc	107		J	P
	Cyanide				NR

CP 8-6-01

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0GL8

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0EY7

Matrix (soil/water): SOIL Lab Sample ID: 39268S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 75.2

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6950			P
7440-36-0	Antimony	1.4	B		P
7440-38-2	Arsenic	5.0			P
7440-39-3	Barium	44.5	B		P
7440-41-7	Beryllium	0.17	B		P
7440-43-9	Cadmium	0.11	B	U	P
7440-70-2	Calcium	3400		J JL	P
7440-47-3	Chromium	17.1			P
7440-48-4	Cobalt	6.5	B		P
7440-50-8	Copper	21.8			P
7439-89-6	Iron	14200			P
7439-92-1	Lead	8.3			P
7439-95-4	Magnesium	4450		J JL	P
7439-96-5	Manganese	209		J JH	P
7439-97-6	Mercury	0.06	U		CV
7440-02-0	Nickel	14.1			P
7440-09-7	Potassium	978	B		P
7782-49-2	Selenium	0.90	U	UJK	P
7440-22-4	Silver	0.57	B	U	P
7440-23-5	Sodium	392	B		P
7440-28-0	Thallium	1.4	U		P
7440-62-2	Vanadium	31.5			P
7440-66-6	Zinc	43.8		J	P
	Cyanide				NR

CP 8-6-01

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0GM0

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0EY7

Matrix (soil/water): SOIL Lab Sample ID: 39269S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 41.1

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3310			P
7440-36-0	Antimony	2.1	B		P
7440-38-2	Arsenic	13.1			P
7440-39-3	Barium	250			P
7440-41-7	Beryllium	0.13	B		P
7440-43-9	Cadmium	6.1			P
7440-70-2	Calcium	209000		J	P
7440-47-3	Chromium	9.2			P
7440-48-4	Cobalt	5.7	B		P
7440-50-8	Copper	28.4			P
7439-89-6	Iron	31100			P
7439-92-1	Lead	346			P
7439-95-4	Magnesium	42200		J	P
7439-96-5	Manganese	1970		J	P
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	40.4			P
7440-09-7	Potassium	2410	B		P
7782-49-2	Selenium	1.6	U	UJ	P
7440-22-4	Silver	0.74	B	U	P
7440-23-5	Sodium	578	B		P
7440-28-0	Thallium	2.5	U		P
7440-62-2	Vanadium	12.2	B		P
7440-66-6	Zinc	2370		+	P
_____	Cyanide				NR

DP 8-6-01

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0GM2

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0EY7

Matrix (soil/water): SOIL Lab Sample ID: 39270S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 85.3

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4250			P
7440-36-0	Antimony	0.90	B		P
7440-38-2	Arsenic	3.2			P
7440-39-3	Barium	44.7	B		P
7440-41-7	Beryllium	0.11	B		P
7440-43-9	Cadmium	0.27	B	U	P
7440-70-2	Calcium	8600		E JL	P
7440-47-3	Chromium	6.0			P
7440-48-4	Cobalt	3.4	B		P
7440-50-8	Copper	24.4			P
7439-89-6	Iron	9160			P
7439-92-1	Lead	23.6			P
7439-95-4	Magnesium	5930		E JL	P
7439-96-5	Manganese	160		N JH	P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	7.8	B		P
7440-09-7	Potassium	682	B		P
7782-49-2	Selenium	0.80	U	NUJK	P
7440-22-4	Silver	0.28	B	U	P
7440-23-5	Sodium	272	B		P
7440-28-0	Thallium	1.2	U		P
7440-62-2	Vanadium	15.4			P
7440-66-6	Zinc	160		+	P
	Cyanide				NR

CP 8-6-01

Color Before: BROWN Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

U.S. EPA - CLP
1

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0GM3

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0EY7

Matrix (soil/water): SOIL Lab Sample ID: 39271S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 60.9

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7660			P
7440-36-0	Antimony	1.2	B		P
7440-38-2	Arsenic	3.0	B		P
7440-39-3	Barium	89.7			P
7440-41-7	Beryllium	0.27	B		P
7440-43-9	Cadmium	0.88	B		P
7440-70-2	Calcium	12100		E JL	P
7440-47-3	Chromium	17.1			P
7440-48-4	Cobalt	5.6	B		P
7440-50-8	Copper	19.7			P
7439-89-6	Iron	14500			P
7439-92-1	Lead	38.5			P
7439-95-4	Magnesium	7540		E JL	P
7439-96-5	Manganese	188		M JH	P
7439-97-6	Mercury	0.08	U		CV
7440-02-0	Nickel	14.5			P
7440-09-7	Potassium	1180	B		P
7782-49-2	Selenium	1.1	U	M UJK	P
7440-22-4	Silver	0.46	B U		P
7440-23-5	Sodium	418	B		P
7440-28-0	Thallium	1.7	U		P
7440-62-2	Vanadium	21.4			P
7440-66-6	Zinc	205		*	P
_____	Cyanide				NR

CP 8-6-01

Color Before: BLACK Clarity Before: Texture: MEDIUM

Color After: YELLOW Clarity After: Artifacts:

Comments:

FORM I - IN ILM04.1

28

EPA SAMPLE NO.

INORGANIC ANALYSIS DATA SHEET

MJ0GM5

Lab Name: Sentinel, Inc. Contract: 68-W-00-085

Lab Code: SENTIN Case No.: 29440 SAS No.: SDG No.: MJ0EY7

Matrix (soil/water): SOIL Lab Sample ID: 39272S

Level (low/med): LOW Date Received: 06/30/01

% Solids: 89.3

Concentration Units (ug/L or mg/Kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3160			P
7440-36-0	Antimony	0.64	U		P
7440-38-2	Arsenic	4.5			P
7440-39-3	Barium	44.6			P
7440-41-7	Beryllium	0.11	B		P
7440-43-9	Cadmium	0.34	B	U	P
7440-70-2	Calcium	27500		E JL	P
7440-47-3	Chromium	7.1			P
7440-48-4	Cobalt	2.5	B		P
7440-50-8	Copper	8.1			P
7439-89-6	Iron	7810			P
7439-92-1	Lead	43.5			P
7439-95-4	Magnesium	15000		E JL	P
7439-96-5	Manganese	209		N JH	P
7439-97-6	Mercury	0.05	U		CV
7440-02-0	Nickel	5.9	B		P
7440-09-7	Potassium	427	B		P
7782-49-2	Selenium	0.75	U	NUJK	P
7440-22-4	Silver	0.20	B	U	P
7440-23-5	Sodium	244	B		P
7440-28-0	Thallium	1.1	U		P
7440-62-2	Vanadium	9.3	B		P
7440-66-6	Zinc	152		+	P
_____	Cyanide				NR

CP 8-6-01

Color Before: BROWN Clarity Before: Texture: COARSE

Color After: YELLOW Clarity After: Artifacts:

Comments:

ENVIRONMENTAL SERVICES ASSISTANCE TEAM

ESAT Region 10
7411 Beach Drive East
Port Orchard, WA 98366
Phone (360) 871-8723

DELIVERABLE NARRATIVE

DATE: August 13, 2001

To: Ginna Grepo-Grove, TOPO, USEPA, Region 10

THROUGH: Dave Dobb, Team Manager, ESAT Region 10 DD

FROM: Chris Pace, Data Validation Task Lead, ESAT Region 10 CP

SUBJECT: Data Validation Report for the Organic Analysis of Samples from the Upper Columbia River Lake Roosevelt/Mines Sites. Case: 29440 SDG: J0EQ6

Account Code: 01T10P50102D106XLA00

Doc. #: ES10-0-1138
TDN: 1050
Task Order: 001
Contract: 68-W-01-027

CC: Gerald Dodo, PO, USEPA, Region 10
Project File

The quality assurance (QA) review of 20 soil samples collected from the above referenced site has been completed. The samples were analyzed for Pest/PCB in accordance with the USEPA Contract Laboratory Program (CLP) Statement of Work (SOW) for Organic Analyses (OLM04.2) by Envirosystems, Inc. of Columbia, MD.

DATA QUALIFICATIONS

The following comments refer to the laboratory performance in meeting the Quality Control Specifications outlined in the USEPA CLP SOW for Organic Analysis (OLM04.2), the USEPA CLP National Functional Guidelines for Organic Data Review (10/99) and the Region 10 Guidelines for CLP Data Review.

The conclusions presented herein are based on the information provided for the review.

Holding Time - Acceptable

All of the samples met the method and technical (40 CFR 136) required holding times with the exception of samples J0ET3, J0ET4 and J0ET5. These samples were extracted 15 days from the sample collection date which only slightly exceeded the suggested technical holding time of 14 days for soils. None of the data were qualified on this basis. The Holding Times Summary listing the pertinent collection, extraction, and analysis dates is attached at the end of this validation report.

Instrument Performance - Acceptable

The GC system met the SOW specified technical acceptance criteria prior to sample analyses, i.e., GC performance checks, retention times, and calibrations. The system remained stable throughout the course of analyses. Instrument blanks were all clean and there were no indications of carry-over.

Initial Calibrations - Acceptable

One Pest/PCB initial calibration was performed. The initial calibration met the SOW technical acceptance criteria.

Continuing Calibration Verification (CCVs) Standards - Acceptable

All of the CCVs met the criteria for frequency of analysis, the retention time and the percent differences (%Ds) criteria.

Compound Quantitation and Detection Limits - Acceptable

All of the samples were analyzed at the contract required quantitation limits (CRQLs). Target compounds that were detected at concentrations less than the CRQLs were qualified as estimated, "J". All of the reported results were adjusted for sample amounts analyzed.

Blanks - Acceptable

No target analytes were detected in any of the method or instrument blanks.

Analytical Sequence - Acceptable

All of the standards, blanks, samples, and QC samples were analyzed in accordance with the SOW specified analytical sequence.

Surrogate Spikes - Acceptable

All of the Pest/PCB surrogate spike recoveries met the applicable QC criteria (30-150%).

Matrix Spike/Matrix Spike Duplicate (MS/MSD) - Acceptable

Pest/PCB sample J0EQ6 was utilized for MS/MSD analyses. The criteria for frequency of analysis, recoveries and RPDs were met.

Sample Clean-up - Acceptable

The pesticide florisil cartridge and GPC calibration checks met the criteria for frequency of analysis and recovery with the following exception:

Endrin had a recovery of 117% in one of the GPC calibration checks which was above the upper QC limit of 110%. Sample results were not affected and therefore, none of the data were qualified on this basis.

Compound Identification

Single component pesticides and aroclors were qualified as follows: where %Ds (between two column concentrations) >30% but ≤60% - detected results were qualified as estimated, "J"; %Ds >60% with concentrations >CRQL - results were qualified as tentatively identified at the estimated concentration , "JN"; %Ds >60% with concentrations <CRQL - results were qualified as non-detects, "U", at the CRQL; %Ds >400% - results were qualified as non-detects with raised quantitation limit if >CRQL.

Laboratory Contact

The laboratory was not contacted for this review.

Overall Assessment

The total number of data points was 560. All data points were qualified as non-detected, "U".

All of the samples were analyzed in accordance with technical specifications outlined in the SOW. The data, as qualified, are acceptable and can be used for all purposes.

Data Qualifiers

U	-	The analyte was not detected at or above the reported result.
J	-	The analyte was positively identified. The associated numerical result is an estimate.
R	-	The data are unusable for all purposes.
N	-	There is evidence the analyte is present in this sample.
JN	-	There is evidence that the analyte is present. The associated numerical result is an estimate.
UJ	-	The analyte was not detected at or above the reported estimated result. The associated numerical value is an estimate of the quantitation limit of the analyte in this sample.
L	-	Low bias.
H	-	High bias.
Q	-	The result is estimated because the concentration is below the Contract Required Quantitation Limits (CRQLs).
K	-	Unknown Bias.

Holding Time Summary - Case 29440 SDG: J0EQ6

Sample Number	Collection Date	VTSR*	Pest/PCB Extraction	Pest/PCB Analysis
J0EQ6	6/20/01	6/22/01	6/27/01	7/19/01
J0ET3	6/21/01	6/28/01	7/6/01	7/18/01
J0ET4	6/21/01	6/28/01	7/6/01	7/18/01
J0ET5	6/21/01	6/28/01	7/6/01	7/19/01
J0EW5	6/21/01	6/28/01	7/6/01	7/19/01
J0EZ4	6/23/01	6/28/01	7/6/01	7/19/01
J0EZ5	6/23/01	6/28/01	7/6/01	7/19/01
J0EZ6	6/24/01	6/28/01	7/6/01	7/19/01
J0F08	6/25/01	6/28/01	7/6/01	7/19/01
J0F09	6/25/01	6/28/01	7/6/01	7/19/01
J0F14	6/26/01	6/30/01	7/6/01	7/19/01
J0F16	6/26/01	6/30/01	7/6/01	7/19/01
J0F18	6/27/01	6/30/01	7/6/01	7/19/01
J0F19	6/27/01	6/30/01	7/6/01	7/19/01
J0FJ1	6/23/01	6/28/01	7/6/01	7/19/01
J0FJ2	6/23/01	6/28/01	7/6/01	7/19/01
J0FK0	6/23/01	6/28/01	7/6/01	7/19/01
J0FK4	6/26/01	6/28/01	7/6/01	7/19/01
J0FK5	6/26/01	6/28/01	7/6/01	7/19/01
J0FL2	6/28/01	6/30/01	7/6/01	7/19/01

*VTSR - Verified time of sample receipt in the laboratory.

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

J0F08

Lab Name: ENVIROSYSTEMS Contract: 68W99023

Lab Code: ENVSYS Case No.: 29440 SAS No.: SDG No.: J0EQ6

Matrix: (soil/water) SOIL Lab Sample ID: 01061682

Sample wt/vol: 30.0 (g/mL) G Lab File ID:

% Moisture: 53 decanted: (Y/N) N Date Received: 06/28/01

Extraction: (Type) SONC Date Extracted: 07/06/01

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 07/19/01

Injection Volume: 2.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 7.7 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	3.6	U
319-85-7	beta-BHC	3.6	U
319-86-8	delta-BHC	3.6	U
58-89-9	gamma-BHC (Lindane)	3.6	U
76-44-8	Heptachlor	3.6	U
309-00-2	Aldrin	3.6	U
1024-57-3	Heptachlor epoxide	3.6	U
959-98-8	Endosulfan I	3.6	U
60-57-1	Dieldrin	7.0	U
72-55-9	4,4'-DDE	7.0	U
72-20-8	Endrin	7.0	U
33213-65-9	Endosulfan II	7.0	U
72-54-8	4,4'-DDD	7.0	U
1031-07-8	Endosulfan sulfate	7.0	U
50-29-3	4,4'-DDT	7.0	U
72-43-5	Methoxychlor	36	U
53494-70-5	Endrin ketone	7.0	U
7421-93-4	Endrin aldehyde	7.0	U
5103-71-9	alpha-Chlordane	3.6	U
5103-74-2	gamma-Chlordane	3.6	U
8001-35-2	Toxaphene	360	U
12674-11-2	Aroclor-1016	70	U
11104-28-2	Aroclor-1221	140	U
11141-16-5	Aroclor-1232	70	U
53469-21-9	Aroclor-1242	70	U
12672-29-6	Aroclor-1248	70	U
11097-69-1	Aroclor-1254	70	U
11096-82-5	Aroclor-1260	70	U

8-13-01

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

J0F09

Lab Name: ENVIROSYSTEMS Contract: 68W99023

Lab Code: ENVSYS Case No.: 29440 SAS No.: SDG No.: J0EQ6

Matrix: (soil/water) SOIL Lab Sample ID: 01061683

Sample wt/vol: 30.0 (g/mL) G Lab File ID:

% Moisture: 27 decanted: (Y/N) N Date Received: 06/28/01

Extraction: (Type) SONC Date Extracted: 07/06/01

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 07/19/01

Injection Volume: 2.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.5 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.3	U
319-85-7	beta-BHC	2.3	U
319-86-8	delta-BHC	2.3	U
58-89-9	gamma-BHC (Lindane)	2.3	U
76-44-8	Heptachlor	2.3	U
309-00-2	Aldrin	2.3	U
1024-57-3	Heptachlor epoxide	2.3	U
959-98-8	Endosulfan I	2.3	U
60-57-1	Dieldrin	4.5	U
72-55-9	4,4'-DDE	4.5	U
72-20-8	Endrin	4.5	U
33213-65-9	Endosulfan II	4.5	U
72-54-8	4,4'-DDD	4.5	U
1031-07-8	Endosulfan sulfate	4.5	U
50-29-3	4,4'-DDT	4.5	U
72-43-5	Methoxychlor	23	U
53494-70-5	Endrin ketone	4.5	U
7421-93-4	Endrin aldehyde	4.5	U
5103-71-9	alpha-Chlordane	2.3	U
5103-74-2	gamma-Chlordane	2.3	U
8001-35-2	Toxaphene	230	U
12674-11-2	Aroclor-1016	45	U
11104-28-2	Aroclor-1221	92	U
11141-16-5	Aroclor-1232	45	U
53469-21-9	Aroclor-1242	45	U
12672-29-6	Aroclor-1248	45	U
11097-69-1	Aroclor-1254	45	U
11096-82-5	Aroclor-1260	45	U

8-15-01

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

J0F14

Lab Name: ENVIROSYSTEMS Contract: 68W99023

Lab Code: ENVSYS Case No.: 29440 SAS No.: SDG No.: J0EQ6

Matrix: (soil/water) SOIL Lab Sample ID: 01061719

Sample wt/vol: 30.0 (g/mL) G Lab File ID:

% Moisture: 47 decanted: (Y/N) N Date Received: 06/30/01

Extraction: (Type) SONC Date Extracted: 07/06/01

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 07/19/01

Injection Volume: 2.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 7.8 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	3.2	U
319-85-7	beta-BHC	3.2	U
319-86-8	delta-BHC	3.2	U
58-89-9	gamma-BHC (Lindane)	3.2	U
76-44-8	Heptachlor	3.2	U
309-00-2	Aldrin	3.2	U
1024-57-3	Heptachlor epoxide	3.2	U
959-98-8	Endosulfan I	3.2	U
60-57-1	Dieldrin	6.2	U
72-55-9	4,4'-DDE	6.2	U
72-20-8	Endrin	6.2	U
33213-65-9	Endosulfan II	6.2	U
72-54-8	4,4'-DDD	6.2	U
1031-07-8	Endosulfan sulfate	6.2	U
50-29-3	4,4'-DDT	6.2	U
72-43-5	Methoxychlor	32	U
53494-70-5	Endrin ketone	6.2	U
7421-93-4	Endrin aldehyde	6.2	U
5103-71-9	alpha-Chlordane	3.2	U
5103-74-2	gamma-Chlordane	3.2	U
8001-35-2	Toxaphene	320	U
12674-11-2	Aroclor-1016	62	U
11104-28-2	Aroclor-1221	130	U
11141-16-5	Aroclor-1232	62	U
53469-21-9	Aroclor-1242	62	U
12672-29-6	Aroclor-1248	62	U
11097-69-1	Aroclor-1254	62	U
11096-82-5	Aroclor-1260	62	U

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

J0F16

Lab Name: ENVIROSYSTEMS Contract: 68W99023

Lab Code: ENVSYS Case No.: 29440 SAS No.: SDG No.: J0EQ6

Matrix: (soil/water) SOIL Lab Sample ID: 01061720

Sample wt/vol: 30.0 (g/mL) G Lab File ID:

% Moisture: 17 decanted: (Y/N) N Date Received: 06/30/01

Extraction: (Type) SONC Date Extracted: 07/06/01

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 07/19/01

Injection Volume: 2.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.0	U
319-85-7	beta-BHC	2.0	U
319-86-8	delta-BHC	2.0	U
58-89-9	gamma-BHC (Lindane)	2.0	U
76-44-8	Heptachlor	2.0	U
309-00-2	Aldrin	2.0	U
1024-57-3	Heptachlor epoxide	2.0	U
959-98-8	Endosulfan I	2.0	U
60-57-1	Dieldrin	4.0	U
72-55-9	4,4'-DDE	4.0	U
72-20-8	Endrin	4.0	U
33213-65-9	Endosulfan II	4.0	U
72-54-8	4,4'-DDD	4.0	U
1031-07-8	Endosulfan sulfate	4.0	U
50-29-3	4,4'-DDT	4.0	U
72-43-5	Methoxychlor	20	U
53494-70-5	Endrin ketone	4.0	U
7421-93-4	Endrin aldehyde	4.0	U
5103-71-9	alpha-Chlordane	2.0	U
5103-74-2	gamma-Chlordane	2.0	U
8001-35-2	Toxaphene	200	U
12674-11-2	Aroclor-1016	40	U
11104-28-2	Aroclor-1221	81	U
11141-16-5	Aroclor-1232	40	U
53469-21-9	Aroclor-1242	40	U
12672-29-6	Aroclor-1248	40	U
11097-69-1	Aroclor-1254	40	U
11096-82-5	Aroclor-1260	40	U

8-13-01

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

J0F18

Lab Name: ENVIROSYSTEMS Contract: 68W99023

Lab Code: ENVSYS Case No.: 29440 SAS No.: SDG No.: J0EQ6

Matrix: (soil/water) SOIL Lab Sample ID: 01061721

Sample wt/vol: 30.0 (g/mL) G Lab File ID:

% Moisture: 17 decanted: (Y/N) N Date Received: 06/30/01

Extraction: (Type) SONC Date Extracted: 07/06/01

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 07/19/01

Injection Volume: 2.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.1 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.0	U
319-85-7	beta-BHC	2.0	U
319-86-8	delta-BHC	2.0	U
58-89-9	gamma-BHC (Lindane)	2.0	U
76-44-8	Heptachlor	2.0	U
309-00-2	Aldrin	2.0	U
1024-57-3	Heptachlor epoxide	2.0	U
959-98-8	Endosulfan I	2.0	U
60-57-1	Dieldrin	4.0	U
72-55-9	4,4'-DDE	4.0	U
72-20-8	Endrin	4.0	U
33213-65-9	Endosulfan II	4.0	U
72-54-8	4,4'-DDD	4.0	U
1031-07-8	Endosulfan sulfate	4.0	U
50-29-3	4,4'-DDT	4.0	U
72-43-5	Methoxychlor	20	U
53494-70-5	Endrin ketone	4.0	U
7421-93-4	Endrin aldehyde	4.0	U
5103-71-9	alpha-Chlordane	2.0	U
5103-74-2	gamma-Chlordane	2.0	U
8001-35-2	Toxaphene	200	U
12674-11-2	Aroclor-1016	40	U
11104-28-2	Aroclor-1221	81	U
11141-16-5	Aroclor-1232	40	U
53469-21-9	Aroclor-1242	40	U
12672-29-6	Aroclor-1248	40	U
11097-69-1	Aroclor-1254	40	U
11096-82-5	Aroclor-1260	40	U

8-13-01

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

J0F19

Lab Name: ENVIROSYSTEMS Contract: 68W99023

Lab Code: ENVSYS Case No.: 29440 SAS No.: SDG No.: J0EQ6

Matrix: (soil/water) SOIL Lab Sample ID: 01061722

Sample wt/vol: 30.0 (g/mL) G Lab File ID:

% Moisture: 44 decanted: (Y/N) N Date Received: 06/30/01

Extraction: (Type) SONC Date Extracted: 07/06/01

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 07/19/01

Injection Volume: 2.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 7.6 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	3.0	U
319-85-7	beta-BHC	3.0	U
319-86-8	delta-BHC	3.0	U
58-89-9	gamma-BHC (Lindane)	3.0	U
76-44-8	Heptachlor	3.0	U
309-00-2	Aldrin	3.0	U
1024-57-3	Heptachlor epoxide	3.0	U
959-98-8	Endosulfan I	3.0	U
60-57-1	Dieldrin	5.9	U
72-55-9	4,4'-DDE	5.9	U
72-20-8	Endrin	5.9	U
33213-65-9	Endosulfan II	5.9	U
72-54-8	4,4'-DDD	5.9	U
1031-07-8	Endosulfan sulfate	5.9	U
50-29-3	4,4'-DDT	5.9	U
72-43-5	Methoxychlor	30	U
53494-70-5	Endrin ketone	5.9	U
7421-93-4	Endrin aldehyde	5.9	U
5103-71-9	alpha-Chlordane	3.0	U
5103-74-2	gamma-Chlordane	3.0	U
8001-35-2	Toxaphene	300	U
12674-11-2	Aroclor-1016	59	U
11104-28-2	Aroclor-1221	120	U
11141-16-5	Aroclor-1232	59	U
53469-21-9	Aroclor-1242	59	U
12672-29-6	Aroclor-1248	59	U
11097-69-1	Aroclor-1254	59	U
11096-82-5	Aroclor-1260	59	U

8-13-01

1E

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

J0FK4

Lab Name: ENVIROSYSTEMS Contract: 68W99023

Lab Code: ENVSYS Case No.: 29440 SAS No.: SDG No.: J0EQ6

Matrix: (soil/water) SOIL Lab Sample ID: 01061687

Sample wt/vol: 30.0 (g/mL) G Lab File ID:

% Moisture: 27 decanted: (Y/N) N Date Received: 06/28/01

Extraction: (Type) SONC Date Extracted: 07/06/01

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 07/19/01

Injection Volume: 2.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 7.6 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.3	U
319-85-7	beta-BHC	2.3	U
319-86-8	delta-BHC	2.3	U
58-89-9	gamma-BHC (Lindane)	2.3	U
76-44-8	Heptachlor	2.3	U
309-00-2	Aldrin	2.3	U
1024-57-3	Heptachlor epoxide	2.3	U
959-98-8	Endosulfan I	2.3	U
60-57-1	Dieldrin	4.5	U
72-55-9	4,4'-DDE	4.5	U
72-20-8	Endrin	4.5	U
33213-65-9	Endosulfan II	4.5	U
72-54-8	4,4'-DDD	4.5	U
1031-07-8	Endosulfan sulfate	4.5	U
50-29-3	4,4'-DDT	4.5	U
72-43-5	Methoxychlor	23	U
53494-70-5	Endrin ketone	4.5	U
7421-93-4	Endrin aldehyde	4.5	U
5103-71-9	alpha-Chlordane	2.3	U
5103-74-2	gamma-Chlordane	2.3	U
8001-35-2	Toxaphene	230	U
12674-11-2	Aroclor-1016	45	U
11104-28-2	Aroclor-1221	92	U
11141-16-5	Aroclor-1232	45	U
53469-21-9	Aroclor-1242	45	U
12672-29-6	Aroclor-1248	45	U
11097-69-1	Aroclor-1254	45	U
11096-82-5	Aroclor-1260	45	U

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

J0FK5

Lab Name: ENVIROSYSTEMS Contract: 68W99023

Lab Code: ENVSYS Case No.: 29440 SAS No.: SDG No.: J0EQ6

Matrix: (soil/water) SOIL Lab Sample ID: 01061688

Sample wt/vol: 30.0 (g/mL) G Lab File ID:

% Moisture: 28 decanted: (Y/N) N Date Received: 06/28/01

Extraction: (Type) SONC Date Extracted: 07/06/01

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 07/19/01

Injection Volume: 2.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.2 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.4	U
319-85-7	beta-BHC	2.4	U
319-86-8	delta-BHC	2.4	U
58-89-9	gamma-BHC (Lindane)	2.4	U
76-44-8	Heptachlor	2.4	U
309-00-2	Aldrin	2.4	U
1024-57-3	Heptachlor epoxide	2.4	U
959-98-8	Endosulfan I	2.4	U
60-57-1	Dieldrin	4.6	U
72-55-9	4,4'-DDE	4.6	U
72-20-8	Endrin	4.6	U
33213-65-9	Endosulfan II	4.6	U
72-54-8	4,4'-DDD	4.6	U
1031-07-8	Endosulfan sulfate	4.6	U
50-29-3	4,4'-DDT	4.6	U
72-43-5	Methoxychlor	24	U
53494-70-5	Endrin ketone	4.6	U
7421-93-4	Endrin aldehyde	4.6	U
5103-71-9	alpha-Chlordane	2.4	U
5103-74-2	gamma-Chlordane	2.4	U
8001-35-2	Toxaphene	240	U
12674-11-2	Aroclor-1016	46	U
11104-28-2	Aroclor-1221	93	U
11141-16-5	Aroclor-1232	46	U
53469-21-9	Aroclor-1242	46	U
12672-29-6	Aroclor-1248	46	U
11097-69-1	Aroclor-1254	46	U
11096-82-5	Aroclor-1260	46	U

8-13-01

ENVIRONMENTAL SERVICES ASSISTANCE TEAM

ESAT Region 10
7411 Beach Drive East
Port Orchard, WA 98366
Phone (360) 871-8723

DELIVERABLE NARRATIVE

DATE: August 14, 2001

To: Ginna Grepo-Grove, TOPO, USEPA, Region 10

THROUGH: Dave Dobb, Team Manager, ESAT Region 10

FROM: Chris Pace, Data Validation Task Lead, ESAT Region 10

SUBJECT: Data Validation Report for the Organic Analysis of Samples from the Upper Columbia River Lake Roosevelt/Mines Sites. Case: 29440 SDG: J0GN6

Account Code: 01T10P50102D106XLA00

Doc. #: ES10-0-1142
TDN: 1050
Task Order: 001
Contract: 68-W-01-027

CC: Gerald Dodo, PO, USEPA, Region 10
Project File

The quality assurance (QA) review of 2 soil samples collected from the above referenced site has been completed. The samples were analyzed for Pest/PCB in accordance with the USEPA Contract Laboratory Program (CLP) Statement of Work (SOW) for Organic Analyses (OLM04.2) by Envirosystems, Inc. of Columbia, MD.

DATA QUALIFICATIONS

The following comments refer to the laboratory performance in meeting the Quality Control Specifications outlined in the USEPA CLP SOW for Organic Analysis (OLM04.2), the USEPA CLP National Functional Guidelines for Organic Data Review (10/99) and the Region 10 Guidelines for CLP Data Review.

The conclusions presented herein are based on the information provided for the review.

Holding Time - Acceptable

All of the samples met the method and technical (40 CFR 136) required holding times. The Holding Times Summary listing the pertinent collection, extraction, and analysis dates is attached at the end of this validation report.

Instrument Performance - Acceptable

The GC system met the SOW specified technical acceptance criteria prior to sample analyses, i.e., GC performance checks, retention times, and calibrations. The system remained stable throughout the course of analyses. Instrument blanks were all clean and there were no indications of carry-over.

Initial Calibrations - Acceptable

One Pest/PCB initial calibration was performed. The initial calibration met the SOW technical acceptance criteria.

Continuing Calibration Verification (CCVs) Standards - Acceptable

All of the CCVs met the criteria for frequency of analysis, the retention time and the percent differences (%Ds) criteria.

Compound Quantitation and Detection Limits - Acceptable

All of the samples were analyzed at the contract required quantitation limits (CRQLs). Target compounds that were detected at concentrations less than the CRQLs were qualified as estimated, "J". All of the reported results were adjusted for sample amounts analyzed.

Blanks - Acceptable

No target analytes were detected in any of the method or instrument blanks.

Analytical Sequence - Acceptable

All of the standards, blanks, samples, and QC samples were analyzed in accordance with the SOW specified analytical sequence.

Surrogate Spikes - Acceptable

All of the Pest/PCB surrogate spike recoveries met the applicable QC criteria (30-150%).

Matrix Spike/Matrix Spike Duplicate (MS/MSD) - Acceptable

Pest/PCB sample J0GN6 was utilized for MS/MSD analyses. The criteria for frequency of analysis, recoveries and RPDs were met.

Sample Clean-up - Acceptable

The pesticide florisil cartridge and GPC calibration checks met the criteria for frequency of analysis and recovery.

Compound Identification

Single component pesticides and aroclors were qualified as follows: where %Ds (between two column concentrations) >30% but ≤60% - detected results were qualified as estimated, "J"; %Ds >60% with concentrations >CRQL - results were qualified as tentatively identified at the estimated concentration , "JN"; %Ds >60% with concentrations <CRQL - results were qualified as non-detects, "U", at the CRQL; %Ds >400% - results were qualified as non-detects with raised quantitation limit if >CRQL.

Laboratory Contact

The laboratory was not contacted for this review.

Overall Assessment

The total number of data points was 56. All data points were qualified as non-detected, "U".

All of the samples were analyzed in accordance with technical specifications outlined in the SOW. The data, as qualified, are acceptable and can be used for all purposes.

Data Qualifiers

U - The analyte was not detected at or above the reported result.

J - The analyte was positively identified. The associated numerical result is an estimate.

R - The data are unusable for all purposes.

N - There is evidence the analyte is present in this sample.

JN - There is evidence that the analyte is present. The associated numerical result is an estimate.

UJ - The analyte was not detected at or above the reported estimated result. The associated numerical value is an estimate of the quantitation limit of the analyte in this sample.

L - Low bias.

H - High bias.

Q - The result is estimated because the concentration is below the Contract Required Quantitation Limits (CRQLs).

K - Unknown Bias.

Holding Time Summary - Case 29440 SDG: J0GN6

Sample Number	Collection Date	VTSR*	Pest/PCB Extraction	Pest/PCB Analysis
J0GN6	6/28/01	6/30/01	7/10/01	7/20/01
J0GN7	6/28/01	6/30/01	7/10/01	7/20/01

*VTSR - Verified time of sample receipt in the laboratory.

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

J0GN6

Lab Name: ENVIROSYSTEMS Contract: 68W99023

Lab Code: ENVSYS Case No.: 29440 SAS No.: SDG No.: J0GN6

Matrix: (soil/water) SOIL Lab Sample ID: 01061744

Sample wt/vol: 30.0 (g/mL) G Lab File ID:

% Moisture: 32 decanted: (Y/N) N Date Received: 06/30/01

Extraction: (Type) SONC Date Extracted: 07/10/01

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 07/20/01

Injection Volume: 2.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 7.8 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.5	U
319-85-7	beta-BHC	2.5	U
319-86-8	delta-BHC	2.5	U
58-89-9	gamma-BHC (Lindane)	2.5	U
76-44-8	Heptachlor	2.5	U
309-00-2	Aldrin	2.5	U
1024-57-3	Heptachlor epoxide	2.5	U
959-98-8	Endosulfan I	2.5	U
60-57-1	Dieldrin	4.9	U
72-55-9	4,4'-DDE	4.9	U
72-20-8	Endrin	4.9	U
33213-65-9	Endosulfan II	4.9	U
72-54-8	4,4'-DDD	4.9	U
1031-07-8	Endosulfan sulfate	4.9	U
50-29-3	4,4'-DDT	4.9	U
72-43-5	Methoxychlor	25	U
53494-70-5	Endrin ketone	4.9	U
7421-93-4	Endrin aldehyde	4.9	U
5103-71-9	alpha-Chlordane	2.5	U
5103-74-2	gamma-Chlordane	2.5	U
8001-35-2	Toxaphene	250	U
12674-11-2	Aroclor-1016	49	U
11104-28-2	Aroclor-1221	99	U
11141-16-5	Aroclor-1232	49	U
53469-21-9	Aroclor-1242	49	U
12672-29-6	Aroclor-1248	49	U
11097-69-1	Aroclor-1254	49	U
11096-82-5	Aroclor-1260	49	U

8/9-14-01

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

J0GN7

Lab Name: ENVIROSYSTEMS Contract: 68W99023

Lab Code: ENVSYS Case No.: 29440 SAS No.: SDG No.: J0GN6

Matrix: (soil/water) SOIL Lab Sample ID: 01061745

Sample wt/vol: 30.0 (g/mL) G Lab File ID:

% Moisture: 23 decanted: (Y/N) N Date Received: 06/30/01

Extraction: (Type) SONC Date Extracted: 07/10/01

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 07/20/01

Injection Volume: 2.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 8.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.2	U
319-85-7	beta-BHC	2.2	U
319-86-8	delta-BHC	2.2	U
58-89-9	gamma-BHC (Lindane)	2.2	U
76-44-8	Heptachlor	2.2	U
309-00-2	Aldrin	2.2	U
1024-57-3	Heptachlor epoxide	2.2	U
959-98-8	Endosulfan I	2.2	U
60-57-1	Dieldrin	4.3	U
72-55-9	4,4'-DDE	4.3	U
72-20-8	Endrin	4.3	U
33213-65-9	Endosulfan II	4.3	U
72-54-8	4,4'-DDD	4.3	U
1031-07-8	Endosulfan sulfate	4.3	U
50-29-3	4,4'-DDT	4.3	U
72-43-5	Methoxychlor	22	U
53494-70-5	Endrin ketone	4.3	U
7421-93-4	Endrin aldehyde	4.3	U
5103-71-9	alpha-Chlordane	2.2	U
5103-74-2	gamma-Chlordane	2.2	U
8001-35-2	Toxaphene	220	U
12674-11-2	Aroclor-1016	43	U
11104-28-2	Aroclor-1221	87	U
11141-16-5	Aroclor-1232	43	U
53469-21-9	Aroclor-1242	43	U
12672-29-6	Aroclor-1248	43	U
11097-69-1	Aroclor-1254	43	U
11096-82-5	Aroclor-1260	43	U

CP 8-14-01

ENVIRONMENTAL SERVICES ASSISTANCE TEAM

ESAT Region 10
7411 Beach Drive East
Port Orchard, WA 98366
Phone (360) 871-8723

DELIVERABLE NARRATIVE

DATE: August 14, 2001

To: Ginna Grepo-Grove, TOPO, USEPA, Region 10

THROUGH: Dave Dobb, Team Manager, ESAT Region 10

FROM: Chris Pace, Data Validation Task Lead, ESAT Region 10

SUBJECT: Data Validation Report for the Organic Analysis of Samples from the Upper Columbia River Lake Roosevelt/Mines Sites. Case: 29440 SDG: J0GL1

Account Code: 01T10P50102D106XLA00

Doc. #: ES10-0-1141
TDN: 1050
Task Order: 001
Contract: 68-W-01-027

CC: Gerald Dodo, PO, USEPA, Region 10
Project File

The quality assurance (QA) review of 20 soil samples collected from the above referenced site has been completed. The samples were analyzed for Pest/PCB in accordance with the USEPA Contract Laboratory Program (CLP) Statement of Work (SOW) for Organic Analyses (OLM04.2) by Envirosystems, Inc. of Columbia, MD.

DATA QUALIFICATIONS

The following comments refer to the laboratory performance in meeting the Quality Control Specifications outlined in the USEPA CLP SOW for Organic Analysis (OLM04.2), the USEPA CLP National Functional Guidelines for Organic Data Review (10/99) and the Region 10 Guidelines for CLP Data Review.

The conclusions presented herein are based on the information provided for the review.

Holding Time - Acceptable

All of the samples met the method and technical (40 CFR 136) required holding times with the exception of samples J0GL1, J0GL2, J0GL3, J0GL4 and J0GL5. These samples were extracted 15 days from the sample collection date which only slightly exceeded the suggested technical holding time of 14 days for soils. None of the data were qualified on this basis. The Holding Times Summary listing the pertinent collection, extraction, and analysis dates is attached at the end of this validation report.

Instrument Performance - Acceptable

The GC system met the SOW specified technical acceptance criteria prior to sample analyses, i.e., GC performance checks, retention times, and calibrations. The system remained stable throughout the course of analyses. Instrument blanks were all clean and there were no indications of carry-over.

Initial Calibrations - Acceptable

One Pest/PCB initial calibration was performed. The initial calibration met the SOW technical acceptance criteria.

Continuing Calibration Verification (CCVs) Standards - Acceptable

All of the CCVs met the criteria for frequency of analysis, the retention time and the percent differences (%Ds) criteria.

Compound Quantitation and Detection Limits - Acceptable

All of the samples were analyzed at the contract required quantitation limits (CRQLs). Target compounds that were detected at concentrations less than the CRQLs were qualified as estimated, "J". All of the reported results were adjusted for sample amounts analyzed.

Blanks - Acceptable

No target analytes were detected in any of the method or instrument blanks.

Analytical Sequence - Acceptable

All of the standards, blanks, samples, and QC samples were analyzed in accordance with the SOW specified analytical sequence.

Surrogate Spikes - Acceptable

All of the Pest/PCB surrogate spike recoveries met the applicable QC criteria (30-150%).

Matrix Spike/Matrix Spike Duplicate (MS/MSD) - Acceptable

Pest/PCB sample J0GN5 was utilized for MS/MSD analyses. The criteria for frequency of analysis, recoveries and RPDs were met.

Sample Clean-up - Acceptable

The pesticide florisil cartridge and GPC calibration checks met the criteria for frequency of analysis and recovery.

Compound Identification

Single component pesticides and aroclors were qualified as follows: where %Ds (between two column concentrations) >30% but ≤60% - detected results were qualified as estimated, "J"; %Ds >60% with concentrations >CRQL - results were qualified as tentatively identified at the estimated concentration , "JN"; %Ds >60% with concentrations <CRQL - results were qualified as non-detects, "U", at the CRQL; %Ds >400% - results were qualified as non-detects with raised quantitation limit if >CRQL.

Laboratory Contact

The laboratory was not contacted for this review.

Overall Assessment

The total number of data points was 560. One (0.18%) was qualified as estimated and tentatively identified because the percent difference between the two analytical columns exceeded 60%. One data point was detected 4,4'-DDT in sample J0GL5 slightly above the CRQL. All other data points were qualified as non-detected, "U".

All of the samples were analyzed in accordance with technical specifications outlined in the SOW. The data, as qualified, are acceptable and can be used for all purposes.

Data Qualifiers

U	-	The analyte was not detected at or above the reported result.
J	-	The analyte was positively identified. The associated numerical result is an estimate.
R	-	The data are unusable for all purposes.
N	-	There is evidence the analyte is present in this sample.
JN	-	There is evidence that the analyte is present. The associated numerical result is an estimate.
UJ	-	The analyte was not detected at or above the reported estimated result. The associated numerical value is an estimate of the quantitation limit of the analyte in this sample.
L	-	Low bias.
H	-	High bias.
Q	-	The result is estimated because the concentration is below the Contract Required Quantitation Limits (CRQLs).
K	-	Unknown Bias.

Holding Time Summary - Case 29440 SDG: J0GL1

Sample Number	Collection Date	VTSR*	Pest/PCB Extraction	Pest/PCB Analysis
J0GL1	6/25/01	6/30/01	7/10/01	7/19/01
J0GL2	6/25/01	6/30/01	7/10/01	7/19/01
J0GL3	6/25/01	6/30/01	7/10/01	7/19/01
J0GL4	6/25/01	6/30/01	7/10/01	7/19/01
J0GL5	6/25/01	6/30/01	7/10/01	7/19/01
J0GL6	6/26/01	6/30/01	7/10/01	7/19/01
J0GL7	6/26/01	6/30/01	7/10/01	7/19/01
J0GL8	6/26/01	6/30/01	7/10/01	7/19/01
J0GM0	6/26/01	6/30/01	7/10/01	7/19/01
J0GM2	6/26/01	6/30/01	7/10/01	7/19/01
J0GM3	6/27/01	6/30/01	7/10/01	7/19/01
J0GM5	6/27/01	6/30/01	7/10/01	7/19/01
J0GM7	6/27/01	6/30/01	7/10/01	7/19/01
J0GM9	6/27/01	6/30/01	7/10/01	7/20/01
J0GN0	6/27/01	6/30/01	7/10/01	7/20/01
J0GN1	6/27/01	6/30/01	7/10/01	7/20/01
J0GN2	6/28/01	6/30/01	7/10/01	7/20/01
J0GN3	6/28/01	6/30/01	7/10/01	7/20/01
J0GN4	6/28/01	6/30/01	7/10/01	7/20/01
J0GN5	6/28/01	6/30/01	7/10/01	7/20/01

*VTSR - Verified time of sample receipt in the laboratory.

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

J0GL1

Lab Name: ENVIROSYSTEMS Contract: 68W99023

Lab Code: ENVSYS Case No.: 29440 SAS No.: SDG No.: J0GL1

Matrix: (soil/water) SOIL Lab Sample ID: 01061724

Sample wt/vol: 30.0 (g/mL) G Lab File ID:

% Moisture: 24 decanted: (Y/N) N Date Received: 06/30/01

Extraction: (Type) SONC Date Extracted: 07/10/01

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 07/19/01

Injection Volume: 2.00 (uL) Dilution Factor: 1.00

GPC Cleanup: (Y/N) Y pH: 7.8 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.2	U
319-85-7	beta-BHC	2.2	U
319-86-8	delta-BHC	2.2	U
58-89-9	gamma-BHC (Lindane)	2.2	U
76-44-8	Heptachlor	2.2	U
309-00-2	Aldrin	2.2	U
1024-57-3	Heptachlor epoxide	2.2	U
959-98-8	Endosulfan I	2.2	U
60-57-1	Dieldrin	4.3	U
72-55-9	4,4'-DDE	4.3	U
72-20-8	Endrin	4.3	U
33213-65-9	Endosulfan II	4.3	U
72-54-8	4,4'-DDD	4.3	U
1031-07-8	Endosulfan sulfate	4.3	U
50-29-3	4,4'-DDT	4.3	U
72-43-5	Methoxychlor	22	U
53494-70-5	Endrin ketone	4.3	U
7421-93-4	Endrin aldehyde	4.3	U
5103-71-9	alpha-Chlordane	2.2	U
5103-74-2	gamma-Chlordane	2.2	U
8001-35-2	Toxaphene	220	U
12674-11-2	Aroclor-1016	43	U
11104-28-2	Aroclor-1221	88	U
11141-16-5	Aroclor-1232	43	U
53469-21-9	Aroclor-1242	43	U
12672-29-6	Aroclor-1248	43	U
11097-69-1	Aroclor-1254	43	U
11096-82-5	Aroclor-1260	43	U

8-14-01

MEMORANDUM

DATE: November 6, 2001

TO: Leatta Dahlhoff, Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, Chemist, E & E, Seattle, WA

SUBJ: **Organic Data Summary Check, Upper Columbia River Mines/Mills ESI, Stevens and Pend Oreille Counties, Washington**

REF: TDD: 01-02-0028 PAN: 001281.0073.01SR

The data quality summary check of 28 solid samples collected from the Upper Columbia River Mines/Mills ESI, Stevens and Pend Oreille Counties, Washington has been completed. Semivolatile Organic Compound and Chlorinated Pesticide/Polychlorinated Biphenyl compound analysis (EPA CLP SOW OLM04.2) was performed by Laucks Testing Laboratory, Seattle, Washington.

The samples were numbered:

J0KC1	J0KC2	J0KC3	J0KC4	J0KC5	J0KC6
J0KC7	J0KC8	J0KC9	J0KD1	J0KD2	J0KD3
J0KD4	J0KH0	J0KH1	J0KH2	J0KH3	J0KH4
J0KH5	J0KH6	J0KH7	J0KJ1	J0KJ2	J0KJ3
J0KJ4	J0KK8	J0KK9	J0KL0		

No discrepancies were noted.

All sample results originally qualified "JQ" by the laboratory to indicate a result less than the CRQL were changed to "JQK" by the secondary reviewer to indicate an estimated quantity less than the CRQL with an unknown bias.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

October 30, 2001

Reply To
Attn Of: OEA-095

MEMORANDUM

SUBJECT: Data validation report for the semi-volatile organic compound (SVOC) and pesticide/polychlorinated biphenyl (Pest/PCB) analysis of samples from the Upper Columbia River/Mines Sites ESI. Case: 29730 SDGs: J0KC1, J0KH1

FROM: Chris Pace, Chemist, OEA

TO: Monica Tonel, SAM, OEC

CC: Mark Woodke, Ecology and Environment, Inc.
Bruce Woods, CLP PO, OEA
Ginna Grepo-Grove, Chemist, OEA

The quality assurance (QA) review of 28 soil samples collected from the above referenced site has been completed. Six samples were analyzed for SVOCs (all in SDG J0KH1) and twenty three for Pest/PCBs in accordance with the USEPA Contract Laboratory Program (CLP) Statement of Work (SOW) for Organic Analyses (OLM04.2) by Laucks Testing Laboratory of Seattle, WA.

The following sample numbers were validated in this report:

SDG: J0KC1

J0KC1	J0KC3	J0KC5	J0KC7	J0KC9	J0KD2	J0KD4
J0KC2	J0KC4	J0KC6	J0KC8	J0KD1	J0KD3	J0KH0

SDG: J0KH1

J0KH1*	J0KH3	J0KH5	J0KH7*	J0KJ2	J0KJ4*	J0KK9
J0KH2*	J0KH4	J0KH6*	J0KJ1	J0KJ3	J0KK8*	J0KL0

* Analyzed for SVOCs.

DATA QUALIFICATIONS

The following comments refer to the laboratory performance in meeting the Quality Control (QC) Specifications outlined in the USEPA CLP SOW for Organic Analysis (OLM04.2) and the USEPA CLP National Functional Guidelines for Organic Data Review (10/99).

The conclusions presented herein are based on the information provided for the review.

Holding Time - Acceptable

The samples were collected between 9/10 and 9/13/01. All samples extracted within 9 days of sample collection and analyzed within 12 days of extraction. All of the samples met the technical required holding times for all analyses.

Instrument Performance Check - Acceptable

All of the GC/MS instrument performance checks met the ion abundance criteria. All of the GC instrument performance checks met the resolution, percent differences (%Ds) and percent breakdown criteria.

Initial Calibrations - Acceptable

One SVOC and one Pest/PCB initial calibration was performed. The initial calibrations met the SOW acceptance criteria for the percent relative standard deviations (%RSDs) and response factors for all target compounds and surrogates.

Continuing Calibration Verification (CCV)

All of the SVOC and Pest/PCB CCV checks met the criteria for frequency of analysis, minimum response factors and %Ds with the following exceptions:

- The %Ds for the following SVOC compounds exceeded the QC limits:

Date/Time of Analysis	Compound	%D	Qualifier Detect/Non-detect
9/26/01 (0935)	benzaldehyde	-36	J/UJ
	2,2'-oxybis(1-chloropropane)	-37	J/UJ
	hexachlorobutadiene	-27	J/UJ
	hexachlorocyclopentadiene	-61	J/UJ
	atrazine	-55	J/UJ
	benzo(k)fluoranthene	27	J/none
	2,4,6-tribromophenol (surr.)	43	none

Quantitation Limits

SVOC samples J0KH1, J0KH2, J0KH6 and J0KH7 required medium level preparation due to sample matrix. The quantitation limits (QLs) were based on the lowest standard concentration analyzed in the initial calibrations. Target compounds that were detected at concentrations less than the contract required quantitation limits (CRQLs) were qualified as estimated, "J". All of the reported results were adjusted for sample amounts analyzed.

Blanks

Bis(2-ethylhexyl)phthalate was detected below the CRQL in the SVOC blanks SBLKL3and SBLKL4. Bis(2-ethylhexyl)phthalate detected in the samples at concentrations less than ten times the value in their associated blank were qualified as non-detects, "U".

No target Pest/PCBs were detected in the method or instrument blanks.

Analytical Sequence - Acceptable

All of the standards, blanks, samples, and QC samples were analyzed in accordance with the SOW specified analytical sequence.

Surrogate Spikes - Acceptable

All of the SVOC and Pest/PCB surrogate spike recoveries met the applicable QC criteria.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) - Acceptable

SVOC samples J0KJ4 (low level preparation) and J0KH7 (medium level preparation) were utilized for MS/MSD analyses. The criteria for frequency of analysis, recoveries and relative percent differences (RPDs) were met.

Pest/PCB samples J0KD2 (SDG J0KC1) and J0KH3 (SDG J0KH1) were utilized for MS/MSD analyses. The criteria for frequency of analysis, recoveries and relative percent differences (RPDs) were met.

Internal Standards - Acceptable

The acceptance criteria for internal standards (IS) are ±30 seconds for retention time (RT) shifts and -50% to +100% of the IS area as compared to the IS RT and area of the daily continuing calibration standard. All of the SVOC GC/MS analyses met the IS area and RT shift criteria.

Compound Identification

All of the compounds detected in the SVOC GC/MS analyses were within the retention time windows, met the USEPA spectral matching criteria and were judged to be acceptable.

Single component pesticides and Aroclors are qualified as follows: where %Ds (between two column concentrations) >30% but ≤60% - detected results were qualified as estimated, "J"; %Ds >60% with concentrations >CRQL - results were qualified as tentatively identified at the estimated concentration, "JN"; %Ds >60% with concentrations <CRQL - results were qualified as non-detects, "U"; %Ds >400% - results were qualified as non-detects with raised quantitation limit if >CRQL. In cases where target compounds were less than the CRQL and the result of chromatographic "noise" or interference the results are qualified as non-detected, "U".

Tentatively Identified Compounds

Peaks that were detected in the samples at areas >10% of the internal standards and were not part of the target compound lists were identified as tentatively identified compounds (TICs). TICs that were both found in the sample and in the associated method blank(s) were qualified as unusable, "R." Peaks that were identified as common laboratory contaminants, solvent preservatives, column bleed or aldol condensation products were qualified as unusable, "R". The rest of the peaks identified as TICs were qualified "NJ", tentatively identified at an estimated concentration.

SVOC samples J0KH1, J0KH2, J0KH6 and J0KH7 had chromatographic peaks present that were unaccounted for on the Form I TIC and/or reported as alkanes. See laboratory contact.

Laboratory Contact

The laboratory was contacted concerning the following:

SVOC samples J0KH1, J0KH2, J0KH6 and J0KH7 had chromatographic peaks present that were unaccounted for on the Form I TIC and/or reported as alkanes. Each of these samples had chromatograms displaying hydrocarbon type patterns. The reported TICs failed to account for many of the later eluting peaks on the hydrocarbon "hump". It was requested that the laboratory provide resubmitted raw data and CLP Forms concerning this issue.

Resolution: The laboratory responded by FAX (hard copy to follow) stating the HP Chemstation software appears to have problems with samples that have severe matrix problems and the only solution is to manually integrate and process. They then state that Lauck's purchased software for CLP inhibits them from manually processing and producing the actual CLP Forms and EDD.

Overall Assessment

The total number of SVOC data points was 390. Four (1.0%) were qualified as non-detected due to blank contamination. Thirty three (8.5%) were qualified as estimated due to values reported below the CRQL and continuing calibrations. The total number of Pest/PCB data points was 644. Two (0.3%) were qualified as non-detected due values reported above the CRQL with high %Ds between analytical columns and chromatographic interference.

All of the samples were analyzed in accordance with technical specifications outlined in the SOW (with the exception of the TIC reporting difficulties discussed above). The data, as qualified, are acceptable and can be used for all purposes.

Data Qualifiers

U	-	The analyte was not detected at or above the reported result.
J	-	The analyte was positively identified. The associated numerical result is an estimate.
R	-	The data are unusable for all purposes.
N	-	There is evidence the analyte is present in this sample.
JN	-	There is evidence that the analyte is present. The associated numerical result is an estimate.
UJ	-	The analyte was not detected at or above the reported estimated result. The associated numerical value is an estimate of the quantitation limit of the analyte in this sample.
L	-	Low bias.
H	-	High bias.
Q	-	The result is estimated because the concentration is below the Contract Required Quantitation Limits (CRQLs).
K	-	Unknown Bias.

EPA SAMPLE NO.

J0KK8

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: LAUCKS TESTING LABORATORIES Contract: 68-W-00-075

Lab Code: LAUCKS Case No.: 29730 SAS No.: SDG No.: J0KH1

Matrix: (soil/water) SOIL Lab Sample ID: 0109281-12

Sample wt/vol: 30 (g/mL) G Lab File ID: L0926015.D

Level: (low/med) LOW Date Received: 09/17/01

% Moisture: 35 Decanted: (Y/N) Y Date Extracted: 09/19/01

Concentrated Extract Volume: 500 (µL) Date Analyzed: 09/26/01

Injection Volume: 2 (µL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.0 Extraction: (Type) PFEX

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
100-52-7	Benzaldehyde	130	J Q
108-95-2	Phenol	510	U
111-44-4	bis(2-Chloroethyl)ether	510	U
95-57-8	2-Chlorophenol	510	U
95-48-7	2-Methylphenol	510	U
108-60-1	2,2'-oxybis(1-Chloropropane)	510	U JK
98-86-2	Acetophenone	60	J Q
106-44-5	4-Methylphenol	81	J Q
621-64-7	N-Nitroso-di-n-propylamine	510	U
67-72-1	Hexachloroethane	510	U
98-95-3	Nitrobenzene	510	U
78-59-1	Isophorone	510	U
88-75-5	2-Nitrophenol	510	U
105-67-9	2,4-Dimethylphenol	510	U
111-91-1	Bis(2-Chloroethoxy)methane	510	U
120-83-2	2,4-Dichlorophenol	510	U
91-20-3	Naphthalene	510	U
106-47-8	4-Chloroaniline	510	U
87-68-3	Hexachlorobutadiene	510	U JK
105-60-2	Caprolactam	510	U
59-50-7	4-Chloro-3-methylphenol	510	U
91-57-6	2-Methylnaphthalene	510	U
77-47-4	Hexachlorocyclopentadiene	510	U JK
88-06-2	2,4,6-Trichlorophenol	510	U
95-95-4	2,4,5-Trichlorophenol	1300	U
92-52-4	1,1'-Biphenyl	510	U
91-58-7	2-Chloronaphthalene	510	U
88-74-4	2-Nitroaniline	1300	U
131-11-3	Dimethylphthalate	510	U
606-20-2	2,6-Dinitrotoluene	510	U
208-96-8	Acenaphthylene	510	U
99-09-2	3-Nitroaniline	1300	U
83-32-9	Acenaphthene	510	U

CP 10-25-01

EPA SAMPLE NO.

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

J0KK8

Lab Name: LAUCKS TESTING LABORATORIES Contract: 68-W-00-075

Lab Code: LAUCKS Case No.: 29730 SAS No.: SDG No.: J0KH1

Matrix: (soil/water) SOIL Lab Sample ID: 0109281-12

Sample wt/vol: 30 (g/mL) G Lab File ID: L0926015.D

Level: (low/med) LOW Date Received: 09/17/01

% Moisture: 35 Decanted: (Y/N) Y Date Extracted: 09/19/01

Concentrated Extract Volume: 500 (µL) Date Analyzed: 09/26/01

Injection Volume: 2 (µL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.0 Extraction: (Type) PFEX

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
51-28-5	2,4-Dinitrophenol	1300	U
100-02-7	4-Nitrophenol	1300	U
132-64-9	Dibenzofuran	510	U
121-14-2	2,4-Dinitrotoluene	510	U
84-66-2	Diethylphthalate	190	J Q K
86-73-7	Fluorene	510	U
7005-72-3	4-Chlorophenyl-phenylether	510	U
100-01-6	4-Nitroaniline	1300	U
534-52-1	4,6-Dinitro-2-methylphenol	1300	U
86-30-6	N-Nitrosodiphenylamine (1)	510	U
101-55-3	4-Bromophenyl-phenylether	510	U
118-74-1	Hexachlorobenzene	510	U
1912-24-9	Atrazine	510	U JK
87-86-5	Pentachlorophenol	1300	U
85-01-8	Phenanthrene	510	U
120-12-7	Anthracene	510	U
86-74-8	Carbazole	510	U
84-74-2	Di-n-butylphthalate	510	U
206-44-0	Fluoranthene	510	U
129-00-0	Pyrene	510	U
85-68-7	Butylbenzylphthalate	510	U
91-94-1	3,3´-Dichlorobenzidine	510	U
56-55-3	Benzo(a)anthracene	510	U
218-01-9	Chrysene	510	U
117-81-7	Bis(2-Ethylhexyl)phthalate	510 ~~70~~	~~JB~~ U
117-84-0	Di-n-octylphthalate	510	U
205-99-2	Benzo(b)fluoranthene	510	U
207-08-9	Benzo(k)fluoranthene	510	U
50-32-8	Benzo(a)pyrene	510	U
193-39-5	Indeno(1,2,3-cd)pyrene	510	U
53-70-3	Dibenzo(a,h)anthracene	510	U
191-24-2	Benzo(g,h,i)perylene	510	U

(1) Cannot be separated from Diphenylamine

CP 10-25-01

EPA SAMPLE NO.

J0KK8

SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET
TENTATIVELY IDENTIFIED COMPOUNDS

Lab Name: LAUCKS TESTING LABORATORIES Contract: 68-W-00-075

Lab Code: LAUCKS Case No.: 29730 SAS No.: SDG No.: J0KH1

Matrix: (soil/water) SOIL Lab Sample ID: 0109281-12

Sample wt/vol: 30 (g/mL) G Lab File ID: L0926015.D

Level: (low/med) LOW Date Received: 09/17/01

% Moisture: 35 Decanted: (Y/N) Y Date Extracted: 09/19/01

Concentrated Extract Volume: 500 (µL) Date Analyzed: 09/26/01

Injection Volume: 2 (µL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.0 Extraction: (Type) PFEX

Number TICs found: 30 CONCENTRATION UNITS:

(µg/L or µg/Kg) UG/KG

	CAS NUMBER	COMPOUND NAME	RT	EST.CONC.	Q
1.		unknown organic acid	9.56	430	JN
2.	120-40-1	Dodecanamide, N,N-bis(2-hydr	11.10	520	JN
3.	112-72-1	1-Tetradecanol	11.21	590	JN
4.	544-63-8	Tetradecanoic acid	12.55	1200	JN
5.	1002-84-2	Pentadecanoic acid	13.22	1000	JN
6.	112-39-0	Hexadecanoic acid, methyl es	13.61	430	JN
7.	2091-29-4	9-Hexadecenoic acid	13.81	7600	JN
8.	57-10-3	Hexadecanoic acid	13.92	4500	JN
9.		unknown	14.37	550	JN
10.		unknown	14.49	870	JN
11.	112-80-1	Oleic Acid	14.98	2200	JN
12.		unknown	15.93	2200	JN
13.	57-11-4	Octadecanoic acid	16.16	440	JN
14.		unknown	16.67	690	JN
15.		unknown	17.20	640	JN
16.	18435-45-5	1-Nonadecene	17.96	780	JN
17.	112-85-6	Docosanoic acid	18.43	540	JN
18.	638-66-4	Octadecanal	18.87	1000	JN
19.	629-96-9	1-Eicosanol	19.23	2000	JN
20.		unknown	19.56	1800	JN
21.		unknown	19.58	580	JN
22.	77899-10-6	(Z)14-Tricosenyl formate	20.03	1000	JN
23.		10-Heneicosene (c,t)	20.41	1000	JN
24.	57-88-5	Cholesterol	20.91	1600	JN
25.	474-67-9	Ergosta-5,22-dien-3-ol, (3.b	21.22	510	JN
26.	83-47-6	.gamma.-Sitosterol	22.41	1300	JN
27.		unknown	22.94	520	JN
28.	22611-26-3	D:C-Friedoolean-8-en-3-one	23.09	1100	JN
29.	1058-61-3	Stigmast-4-en-3-one BC	23.70	480	JN
~~30.~~		~~unknown~~	~~24.94~~	~~600~~	~~JB~~ R

10-25-01

EPA SAMPLE NO.

PESTICIDE ORGANICS ANALYSIS DATA SHEET

J0KK8

Lab Name: LAUCKS TESTING LABORATORIES Contract: 68-W-00-075

Lab Code: LAUCKS Case No.: 29730 SAS No.: SDG No.: J0KH1

Matrix: (soil/water) SOIL Lab Sample ID: 0109281-12

Sample wt/vol: 30 (g/mL) G Lab File ID: A930120.d

% Moisture: 36 Decanted: (Y/N) Y Date Received: 09/17/01

Extraction: (Type) PFEX Date Extracted: 09/19/01

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 10/01/01

Injection Volume: 1 (uL) Dilution Factor 1

GPC Cleanup: (Y/N) Y pH: 7.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (µg/L or µg/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.7	U
319-85-7	beta-BHC	2.7	U
319-86-8	delta-BHC	2.7	U
58-89-9	gamma-BHC (Lindane)	2.7	U
76-44-8	Heptachlor	2.7	U
309-00-2	Aldrin	2.7	U
1024-57-3	Heptachlor epoxide	2.7	U
959-98-8	Endosulfan I	2.7	U
60-57-1	Dieldrin	5.2	U
72-55-9	4,4´-DDE	5.2	U
72-20-8	Endrin	5.2	U
33213-65-9	Endosulfan II	5.2	U
72-54-8	4,4´-DDD	5.2	U
1031-07-8	Endosulfan sulfate	5.2	U
50-29-3	4,4´-DDT	5.2	U
72-43-5	Methoxychlor	27	U
53494-70-5	Endrin ketone	5.2	U
7421-93-4	Endrin aldehyde	5.2	U
5103-71-9	alpha-Chlordane	2.7	U
5103-74-2	gamma-Chlordane	2.7	U
8001-35-2	Toxaphene	270	U
12674-11-2	Aroclor-1016	52	U
11104-28-2	Aroclor-1221	100	U
11141-16-5	Aroclor-1232	52	U
53469-21-9	Aroclor-1242	52	U
12672-29-6	Aroclor-1248	52	U
11097-69-1	Aroclor-1254	52	U
11096-82-5	Aroclor-1260	52	U

CP 10-25-01

ecology and environment, inc.
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MEMORANDUM

DATE: July 24, 2001

TO: Leatta Dahlhoff, Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, START-Chemist, E & E, Seattle, WA MW

SUBJ: **Organic Data Quality Assurance Review, Upper Columbia River Mines Site, Northeast Washington**

REF: TDD: 01-02-0028

The data quality assurance review of 33 soil samples collected from the Upper Columbia River Mines site located in Northeast Washington has been completed. Analysis for Total Organic Carbon (Lloyd Kahn Method) was performed by the Ecology and Environment, Inc., Analytical Services Center, Lancaster, New York.

The samples were numbered:

				TCBK01SD	
ORSP01SD	ORSP02SD	BBPPO1SD	BBPP02SD	POBK01SD	~~POCR01SD~~ PO CK01SD
VSPP01SD	VSPP02SD	PRRS01SD	PRTB01SD	PRRS02SD	PRTB02SD
PRTB03SD	PRTB04SD	PRTB05SD	PRRS03SD	POPP02SD	POPP03SD
POSP02SD	POSP01SD	PRTB10SD	JOPP01SD	POBK01SD	~~POPP04SD~~ GMPP04SD
GMPP05SD	~~POPP05SD~~	PRBK01SD	PRBK02SD	PRBK03SD	PRBK04SD	PRTB06SD
PRTB07SD	PRTB08SD	PRTB09SD			

Data Qualifications:

1. Sample Holding Times: Satisfactory.

All samples were maintained at 4°C (± 2°C). The samples were collected between June 22 and June 28, 2001, and were analyzed on July 9 or 10, 2001. All samples were analyzed within QC holding time limits except samples VSPP01SD, VSPP02SD, PRTB01SD and PRRS02SD; the reported reanalyses for these samples were qualified as estimated quantities (J).

2. Calibration: Acceptable.

A four-point initial calibration was performed daily prior to sample analysis with all correlation coefficients greater than 0.995. Continuing calibrations were performed a minimum of every 10 samples with all results within 10% of the true values.

3. **Blanks: Acceptable.**

A method blank was analyzed at the required frequency of every 20 samples. There were no detections in the method blanks above the method reporting limit.

4. **Laboratory Control Samples (LCS): Acceptable.**

All LCS recoveries were within QC limits of 71% to 125%.

5. **Quadruplicate Analysis: Satisfactory.**

All method quadruplicate results were within QC limits except the analysis of sample POBK01SD; this outlier was due to matrix interferences. No action was taken based on the quadruplicate outlier alone.

6. **Quantitation: Acceptable**

TOC concentrations were correctly calculated.

7. **Laboratory Contact: Not Required**

No laboratory contact was required.

8. **Overall Assessment**

The overall usefulness of the data is based on the criteria outlined in the analytical method. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

J - The associated numerical value is an estimated quantity because the reported concentrations were less than the sample quantitation limits or because quality control criteria limits were not met.

Ecology and Environment, Inc.

Analytical Services Center

4493 Walden Avenue

Lancaster, New York 14086-

Laboratory Results

NYS ELAP ID#: 10486

Phone: (716) 685-8080

CLIENT: E and E Seattle Office **Client Sample ID:** **ORSP01SD**

Lab Order: 0107001 **Alt. Client ID:** ORSP01SD

Project: Upper Columbia River Phase I **Collection Date:** 6/27/01 12:40:00 PM

Lab ID: **0107001-01A** **Sample Type:** SAMP **Matrix:** SOIL **% Moist:** 17.40

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	19500		2410	mg/Kg-dry	1	7/9/01	TOC 5050A_SSM_010709	RLG

Definitions:

ND - Not Detected at the Reporting Limit

J - Analyte detected below Reporting limits

B - Analyte detected in the associated Method Blank

H - Value exceeds Maximum Contaminant Level

* - Recovery outside limits

R - RPD outside recovery limits

E - Value above quantitation range

Surr - Denotes Surrogate Compound

M -Matrix Spike recovery outside limits

Q - Qualifier A -Result by Method of Std. Addition

D - Diluted due to matrix or extended target compounds

N - Single Column Analysis

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Lancaster, New York 14086-

Laboratory Results

NYS ELAP ID#: 10486
Phone: (716) 685-8080

CLIENT: E and E Seattle Office
Lab Order: 0107001
Project: Upper Columbia River Phase I
Lab ID: 0107001-02A **Sample Type:** SAMP

Client Sample ID: ORSP02SD
Alt. Client ID: ORSP02SD
Collection Date: 6/27/01 2:05:00 PM
Matrix: SOIL **% Moist:** 32.70

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	19200		2850	mg/Kg-dry	1	7/9/01	TOC 5050A_SSM_010709	RLG

7/11/01
7-24-01

Definitions:
ND - Not Detected at the Reporting Limit
J - Analyte detected below Reporting limits
B - Analyte detected in the associated Method Blank
H - Value exceeds Maximum Contaminant Level
* - Recovery outside limits
R - RPD outside recovery limits
E - Value above quantitation range
Surr - Denotes Surrogate Compound
M -Matrix Spike recovery outside limits
Q - Qualifier A -Result by Method of Std. Addition
D - Diluted due to matrix or extended target compounds
N - Single Column Analysis

LIMS Version #: 3.1.1.9 - 7/6/01 2:00:00 PM

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Laboratory Results

NYS ELAP ID#: 10486

Phone: (716) 685-8080

CLIENT: E and E Seattle Office
Lab Order: 0107001
Project: Upper Columbia River Phase I
Lab ID: 0107001-03A **Sample Type:** SAMP

Client Sample ID: BBPP01SD
Alt. Client ID: BBPP01SD
Collection Date: 6/26/01 1:00:00 PM
Matrix: SOIL **% Moist:** 11.40

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	3530		2160	mg/Kg-dry	1	7/9/01	TOC 5050A_SSM_010709	RLG

Definitions:
ND - Not Detected at the Reporting Limit
J - Analyte detected below Reporting limits
B - Analyte detected in the associated Method Blank
H - Value exceeds Maximum Contaminant Level
* - Recovery outside limits
R - RPD outside recovery limits
E - Value above quantitation range
Surr - Denotes Surrogate Compound
M -Matrix Spike recovery outside limits
Q - Qualifier A -Result by Method of Std. Addition
D - Diluted due to matrix or extended target compounds
N - Single Column Analysis

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Lancaster, New York 14086-

Laboratory Results

NYS ELAP ID#: 10486
Phone: (716) 685-8080

CLIENT:	E and E Seattle Office	**Client Sample ID:**	**BBPP02SD**
Lab Order:	0107001	**Alt. Client ID:**	BBPP02SD
Project:	Upper Columbia River Phase I	**Collection Date:**	6/26/01 1:05:00 PM
Lab ID:	**0107001-04A** **Sample Type:** SAMP	**Matrix:**	SOIL **% Moist:** 51.20

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	56300		3930	mg/Kg-dry	1	7/9/01	TOC 5050A_SSM_010709	RLG

Definitions:
ND - Not Detected at the Reporting Limit
J - Analyte detected below Reporting limits
B - Analyte detected in the associated Method Blank
H - Value exceeds Maximum Contaminant Level
* - Recovery outside limits
R - RPD outside recovery limits
E - Value above quantitation range
Surr - Denotes Surrogate Compound
M -Matrix Spike recovery outside limits
Q - Qualifier
A -Result by Method of Std. Addition
D - Diluted due to matrix or extended target compounds
N - Single Column Analysis

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Laboratory Results

NYS ELAP ID#: 10486

Phone: (716) 685-8080

CLIENT: E and E Seattle Office

Client Sample ID: ~~POBK01SD~~ TCBK01SD

Lab Order: 0107001

Alt. Client ID: POBK01SD

Project: Upper Columbia River Phase I

Collection Date: 6/25/01 3:50:00 PM

Lab ID: 0107001-05A **Sample Type:** SAMP

Matrix: SOIL

% Moist: 40.90

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	18800		3330	mg/Kg-dry	1	7/9/01	TOC 5050A_SSM_010709	RLG

Definitions:

ND - Not Detected at the Reporting Limit

J - Analyte detected below Reporting limits

B - Analyte detected in the associated Method Blank

H - Value exceeds Maximum Contaminant Level

* - Recovery outside limits

R - RPD outside recovery limits

E - Value above quantitation range

Surr - Denotes Surrogate Compound

M -Matrix Spike recovery outside limits

Q - Qualifier A -Result by Method of Std. Addition

D - Diluted due to matrix or extended target compounds

N - Single Column Analysis

LIMS Version #: 3.1.1.9 - 7/6/01 2:00:00 PM

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Lancaster, New York 14086-

Laboratory Results

NYS ELAP ID#: 10486
Phone: (716) 685-8080

CLIENT: E and E Seattle Office
Client Sample ID: ~~POCR01SD~~ POCK01SD
Lab Order: 0107001
Alt. Client ID: POCR01SD
Project: Upper Columbia River Phase I
Collection Date: 6/25/01 4:28:00 PM
Lab ID: 0107001-06A **Sample Type:** SAMP **Matrix:** SOIL **% Moist:** 37.90

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	36100		3100	mg/Kg-dry	1	7/9/01	TOC 5050A_SSM_010709	RLG

7/11/01

Definitions:
ND - Not Detected at the Reporting Limit
J - Analyte detected below Reporting limits
B - Analyte detected in the associated Method Blank
H - Value exceeds Maximum Contaminant Level
* - Recovery outside limits
R - RPD outside recovery limits
E - Value above quantitation range
Surr - Denotes Surrogate Compound
M -Matrix Spike recovery outside limits
Q - Qualifier A -Result by Method of Std. Addition
D - Diluted due to matrix or extended target compounds
N - Single Column Analysis

Ecology and Environment, Inc.

Analytical Services Center

4493 Walden Avenue

Lancaster, New York 14086-

Laboratory Results

NYS ELAP ID#: 10486

Phone: (716) 685-8080

CLIENT: E and E Seattle Office
Lab Order: 0107001
Project: Upper Columbia River Phase I
Lab ID: 0107001-09A **Sample Type:** SAMP

Client Sample ID: MJ0GL0
Alt. Client ID: PRRS01SD
Collection Date: 6/25/01 11:00:00 AM
Matrix: SOIL **% Moist:** 23.10

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	7610		2500	mg/Kg-dry	1	7/9/01	TOC 5050A_SSM_010709	RLG

7/24/01

Definitions:
ND - Not Detected at the Reporting Limit
J - Analyte detected below Reporting limits
B - Analyte detected in the associated Method Blank
H - Value exceeds Maximum Contaminant Level
* - Recovery outside limits
R - RPD outside recovery limits
E - Value above quantitation range
Surr - Denotes Surrogate Compound
M -Matrix Spike recovery outside limits
Q - Qualifier A -Result by Method of Std. Addition
D - Diluted due to matrix or extended target compounds
N - Single Column Analysis

Ecology and Environment, Inc.

Analytical Services Center

4493 Walden Avenue

Lancaster, New York 14086-

Laboratory Results

NYS ELAP ID#: 10486

Phone: (716) 685-8080

CLIENT:	E and E Seattle Office	**Client Sample ID:**	MJ0GL1
Lab Order:	0107001	**Alt. Client ID:**	PRTB01SD
Project:	Upper Columbia River Phase I	**Collection Date:**	6/25/01 12:00:00 PM
Lab ID:	0107001-10A	**Sample Type:** SAMP	**Matrix:** SOIL

% Moist: 64.50

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	74800		11000	mg/Kg-dry	1	7/10/01	TOC 5050A_SSM_010710	RLG

Definitions:

ND - Not Detected at the Reporting Limit

J - Analyte detected below Reporting limits

B - Analyte detected in the associated Method Blank

H - Value exceeds Maximum Contaminant Level

* - Recovery outside limits

R - RPD outside recovery limits

E - Value above quantitation range

Surr - Denotes Surrogate Compound

M -Matrix Spike recovery outside limits

Q - Qualifier A -Result by Method of Std. Addition

D - Diluted due to matrix or extended target compounds

N - Single Column Analysis

LIMS Version #: 3.1.1.9 - 7/6/01 2:00:00 PM

Ecology and Environment, Inc.

Analytical Services Center

4493 Walden Avenue

Lancaster, New York 14086-

Laboratory Results

NYS ELAP ID#: 10486

Phone: (716) 685-8080

CLIENT: E and E Seattle Office **Client Sample ID:** MJ0GL3

Lab Order: 0107001 **Alt. Client ID:** PRRS02SD

Project: Upper Columbia River Phase I **Collection Date:** 6/25/01 12:30:00 PM

Lab ID: 0107001-11A **Sample Type:** SAMP **Matrix:** SOIL **% Moist:** 22.70

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	595	J	2520	mg/Kg-dry	1	7/10/01	TOC 5050A_SSM_010710	RLG

Definitions:

ND - Not Detected at the Reporting Limit

J - Analyte detected below Reporting limits

B - Analyte detected in the associated Method Blank

H - Value exceeds Maximum Contaminant Level

* - Recovery outside limits

R - RPD outside recovery limits

E - Value above quantitation range

Surr - Denotes Surrogate Compound

M -Matrix Spike recovery outside limits

Q - Qualifier A -Result by Method of Std. Addition

D - Diluted due to matrix or extended target compounds

N - Single Column Analysis

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Laboratory Results

NYS ELAP ID#: 10486

Phone: (716) 685-8080

CLIENT:	E and E Seattle Office	**Client Sample ID:**	MJ0GL4
Lab Order:	0107001	**Alt. Client ID:**	PRTB02SD
Project:	Upper Columbia River Phase I	**Collection Date:**	6/25/01 1:45:00 PM
Lab ID:	0107001-12A **Sample Type:** SAMP	**Matrix:**	SOIL **% Moist:** 43.20

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	28900		3490	mg/Kg-dry	1	7/9/01	TOC 5050A_SSM_010709	RLG

Definitions:
ND - Not Detected at the Reporting Limit
J - Analyte detected below Reporting limits
B - Analyte detected in the associated Method Blank
H - Value exceeds Maximum Contaminant Level
* - Recovery outside limits
R - RPD outside recovery limits
E - Value above quantitation range
Surr - Denotes Surrogate Compound
M -Matrix Spike recovery outside limits
Q - Qualifier
A -Result by Method of Std. Addition
D - Diluted due to matrix or extended target compounds
N - Single Column Analysis

LIMS Version #: 3.1.1.9 - 7/6/01 2:00:00 PM

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Laboratory Results

NYS ELAP ID#: 10486

Phone: (716) 685-8080

CLIENT: E and E Seattle Office
Client Sample ID: MJ0GL5

Lab Order: 0107001
Alt. Client ID: PRTB03SD

Project: Upper Columbia River Phase I
Collection Date: 6/25/01 2:15:00 PM

Lab ID: 0107001-13A **Sample Type:** SAMP
Matrix: SOIL **% Moist:** 55.60

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	48200		4370	mg/Kg-dry	1	7/9/01	TOC 5050A_SSM_010709	RLG

Definitions:
ND - Not Detected at the Reporting Limit
J - Analyte detected below Reporting limits
B - Analyte detected in the associated Method Blank
H - Value exceeds Maximum Contaminant Level
* - Recovery outside limits
R - RPD outside recovery limits
E - Value above quantitation range
Surr - Denotes Surrogate Compound
M -Matrix Spike recovery outside limits
Q - Qualifier
A -Result by Method of Std. Addition
D - Diluted due to matrix or extended target compounds
N - Single Column Analysis

LIMS Version #: 3.1.1.9 - 7/6/01 2:00:00 PM

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Laboratory Results

NYS ELAP ID#: 10486

Phone: (716) 685-8080

CLIENT:	E and E Seattle Office	**Client Sample ID:**	MJ0GL6
Lab Order:	0107001	**Alt. Client ID:**	PRTB04SD
Project:	Upper Columbia River Phase I	**Collection Date:**	6/26/01 10:10:00 AM
Lab ID:	0107001-14A **Sample Type:** SAMP	**Matrix:**	SOIL **% Moist:** 63.30

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	77300		5350	mg/Kg-dry	1	7/9/01	TOC 5050A_SSM_010709	RLG

Definitions:

ND - Not Detected at the Reporting Limit

J - Analyte detected below Reporting limits

B - Analyte detected in the associated Method Blank

H - Value exceeds Maximum Contaminant Level

* - Recovery outside limits

R - RPD outside recovery limits

E - Value above quantitation range

Surr - Denotes Surrogate Compound

M -Matrix Spike recovery outside limits

Q - Qualifier A -Result by Method of Std. Addition

D - Diluted due to matrix or extended target compounds

N - Single Column Analysis

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Laboratory Results

NYS ELAP ID#: 10486

Phone: (716) 685-8080

CLIENT:	E and E Seattle Office	**Client Sample ID:**	MJ0GL7
Lab Order:	0107001	**Alt. Client ID:**	PRTB05SD
Project:	Upper Columbia River Phase I	**Collection Date:**	6/26/01 10:45:00 AM
Lab ID:	**0107001-15A** **Sample Type:** SAMP	**Matrix:**	SOIL **% Moist:** 22.30

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	14100		2440	mg/Kg-dry	1	7/9/01	TOC 5050A_SSM_010709	RLG

Definitions:

ND - Not Detected at the Reporting Limit
J - Analyte detected below Reporting limits
B - Analyte detected in the associated Method Blank
H - Value exceeds Maximum Contaminant Level
* - Recovery outside limits
R - RPD outside recovery limits
E - Value above quantitation range
Surr - Denotes Surrogate Compound
M -Matrix Spike recovery outside limits
Q - Qualifier
A -Result by Method of Std. Addition
D - Diluted due to matrix or extended target compounds
N - Single Column Analysis

LIMS Version #: 3.1.1.9 - 7/6/01 2:00:00 PM

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NYS ELAP ID#: 10486
Phone: (716) 685-8080

Laboratory Results

CLIENT: E and E Seattle Office
Lab Order: 0107001
Project: Upper Columbia River Phase I
Lab ID: 0107001-16A **Sample Type:** SAMP

Client Sample ID: MJ0GL8
Alt. Client ID: PRRS03SD
Collection Date: 6/26/01 11:40:00 AM
Matrix: SOIL **% Moist:** 22.60

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	581	J	2450	mg/Kg-dry	1	7/9/01	TOC 5050A_SSM_010709	RLG

Definitions:
ND - Not Detected at the Reporting Limit
J - Analyte detected below Reporting limits
B - Analyte detected in the associated Method Blank
H - Value exceeds Maximum Contaminant Level
* - Recovery outside limits
R - RPD outside recovery limits
E - Value above quantitation range
Surr - Denotes Surrogate Compound
M -Matrix Spike recovery outside limits
Q - Qualifier A -Result by Method of Std. Addition
D - Diluted due to matrix or extended target compounds
N - Single Column Analysis

LIMS Version #: 3.1.1.9 - 7/6/01 2:00:00 PM

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Laboratory Results

NYS ELAP ID#: 10486

Phone: (716) 685-8080

CLIENT: E and E Seattle Office
Client Sample ID: MJ0GM0
Lab Order: 0107001
Alt. Client ID: POPP02SD
Project: Upper Columbia River Phase I
Collection Date: 6/26/01 1:40:00 PM
Lab ID: 0107001-17A **Sample Type:** SAMP
Matrix: SOIL **% Moist:** 53.50

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	46100		4120	mg/Kg-dry	1	7/9/01	TOC 5050A_SSM_010709	RLG

MV 7-24-01

Definitions:
ND - Not Detected at the Reporting Limit
J - Analyte detected below Reporting limits
B - Analyte detected in the associated Method Blank
H - Value exceeds Maximum Contaminant Level
* - Recovery outside limits
R - RPD outside recovery limits
E - Value above quantitation range
Surr - Denotes Surrogate Compound
M -Matrix Spike recovery outside limits
Q - Qualifier A -Result by Method of Std. Addition
D - Diluted due to matrix or extended target compounds
N - Single Column Analysis

LIMS Version #: 3.1.1.9 - 7/6/01 2:00:00 PM

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Laboratory Results

NYS ELAP ID#: 10486

Phone: (716) 685-8080

CLIENT:	E and E Seattle Office	**Client Sample ID:**	**MJ0GM2**
Lab Order:	0107001	**Alt. Client ID:**	POPP03SD
Project:	Upper Columbia River Phase I	**Collection Date:**	6/26/01 2:25:00 PM
Lab ID:	**0107001-18A** **Sample Type:** SAMP	**Matrix:**	SOIL **% Moist:** 16.80

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	541	J	2300	mg/Kg-dry	1	7/9/01	TOC 5050A_SSM_010709	RLG

Definitions:

ND - Not Detected at the Reporting Limit

J - Analyte detected below Reporting limits

B - Analyte detected in the associated Method Blank

H - Value exceeds Maximum Contaminant Level

* - Recovery outside limits

R - RPD outside recovery limits

E - Value above quantitation range

Surr - Denotes Surrogate Compound

M -Matrix Spike recovery outside limits

Q - Qualifier A -Result by Method of Std. Addition

D - Diluted due to matrix or extended target compounds

N - Single Column Analysis

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NYS ELAP ID#: 10486

Phone: (716) 685-8080

CLIENT:	E and E Seattle Office	**Client Sample ID:**	MJ0FK5
Lab Order:	0107001	**Alt. Client ID:**	POSP02SD
Project:	Upper Columbia River Phase I	**Collection Date:**	6/26/01 9:35:00 AM
Lab ID:	0107001-19A **Sample Type:** SAMP	**Matrix:**	SOIL **% Moist:** 26.20

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	36100		2600	mg/Kg-dry	1	7/9/01	TOC 5050A_SSM_010709	RLG

MW 7-24-01

Definitions:
ND - Not Detected at the Reporting Limit
J - Analyte detected below Reporting limits
B - Analyte detected in the associated Method Blank
H - Value exceeds Maximum Contaminant Level
* - Recovery outside limits
R - RPD outside recovery limits
E - Value above quantitation range
Surr - Denotes Surrogate Compound
M -Matrix Spike recovery outside limits
Q - Qualifier
A -Result by Method of Std. Addition
D - Diluted due to matrix or extended target compounds
N - Single Column Analysis

LIMS Version #: 3.1.1.9 - 7/6/01 2:00:00 PM

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Laboratory Results

NYS ELAP ID#: 10486

Phone: (716) 685-8080

CLIENT: E and E Seattle Office

Lab Order: 0107001

Project: Upper Columbia River Phase I

Lab ID: **0107001-20A** **Sample Type:** SAMP

Client Sample ID: **MJ0FL7**

Alt. Client ID: POSP01SD

Collection Date: 6/26/01 9:11:00 AM

Matrix: SOIL **% Moist:** 25.00

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	62000		5100	mg/Kg-dry	1	7/10/01	TOC 5050A_SSM_010710	RLG

MW 7/24/01

Definitions:

ND - Not Detected at the Reporting Limit

J - Analyte detected below Reporting limits

B - Analyte detected in the associated Method Blank

H - Value exceeds Maximum Contaminant Level

* - Recovery outside limits

R - RPD outside recovery limits

E - Value above quantitation range

Surr - Denotes Surrogate Compound

M -Matrix Spike recovery outside limits

Q - Qualifier A -Result by Method of Std. Addition

D - Diluted due to matrix or extended target compounds

N - Single Column Analysis

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Laboratory Results

NYS ELAP ID#: 10486

Phone: (716) 685-8080

CLIENT: E and E Seattle Office **Client Sample ID:** **PRTB10SD**

Lab Order: 0107001 **Alt. Client ID:** PRTB10SD

Project: Upper Columbia River Phase I **Collection Date:** 6/28/01 2:55:00 PM

Lab ID: **0107001-21A** **Sample Type:** SAMP **Matrix:** SOIL **% Moist:** 25.90

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	1520	J	2630	mg/Kg-dry	1	7/10/01	TOC 5050A_SSM_010710	RLG

7-24-01

Definitions:

ND - Not Detected at the Reporting Limit

J - Analyte detected below Reporting limits

B - Analyte detected in the associated Method Blank

H - Value exceeds Maximum Contaminant Level

* - Recovery outside limits

R - RPD outside recovery limits

E - Value above quantitation range

Surr - Denotes Surrogate Compound

M -Matrix Spike recovery outside limits

Q - Qualifier A -Result by Method of Std. Addition

D - Diluted due to matrix or extended target compounds

N - Single Column Analysis

LIMS Version #: 3.1.1.9 - 7/6/01 2:00:00 PM

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Laboratory Results

NYS ELAP ID#: 10486
Phone: (716) 685-8080

CLIENT: E and E Seattle Office
Client Sample ID: JOPP01SD
Lab Order: 0107001
Alt. Client ID: JOPP01SD
Project: Upper Columbia River Phase I
Collection Date: 6/28/01 9:35:00 AM
Lab ID: 0107001-22A **Sample Type:** SAMP **Matrix:** SOIL **% Moist:** 11.40

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	1050	J	4420	mg/Kg-dry	1	7/10/01	TOC 5050A_SSM_010710	RLG

Definitions:
ND - Not Detected at the Reporting Limit
J - Analyte detected below Reporting limits
B - Analyte detected in the associated Method Blank
H - Value exceeds Maximum Contaminant Level
* - Recovery outside limits
R - RPD outside recovery limits
E - Value above quantitation range
Surr - Denotes Surrogate Compound
M -Matrix Spike recovery outside limits
Q - Qualifier A -Result by Method of Std. Addition
D - Diluted due to matrix or extended target compounds
N - Single Column Analysis

LIMS Version #: 3.1.1.9 - 7/6/01 2:00:00 PM

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Laboratory Results

NYS ELAP ID#: 10486

Phone: (716) 685-8080

CLIENT:	E and E Seattle Office	**Client Sample ID:**	**POBK01SD**
Lab Order:	0107001	**Alt. Client ID:**	POBK01SD
Project:	Upper Columbia River Phase I	**Collection Date:**	6/27/01 1:00:00 PM
Lab ID:	**0107001-23A** **Sample Type:** SAMP	**Matrix:**	SOIL **% Moist:** 27.80

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	13700		4780	mg/Kg-dry	1	7/10/01	TOC 5050A_SSM_010710	RLG

MW
7/24/01

Definitions:

ND - Not Detected at the Reporting Limit
J - Analyte detected below Reporting limits
B - Analyte detected in the associated Method Blank
H - Value exceeds Maximum Contaminant Level
* - Recovery outside limits
R - RPD outside recovery limits
E - Value above quantitation range
Surr - Denotes Surrogate Compound
M -Matrix Spike recovery outside limits
Q - Qualifier
A -Result by Method of Std. Addition
D - Diluted due to matrix or extended target compounds
N - Single Column Analysis

LIMS Version #: 3.1.1.9 - 7/6/01 2:00:00 PM

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Laboratory Results

NYS ELAP ID#: 10486

Phone: (716) 685-8080

CLIENT: E and E Seattle Office

Client Sample ID: ~~POPP04SD~~ GMPP04SD

Lab Order: 0107001

Alt. Client ID: POPP04SD

Project: Upper Columbia River Phase I

Collection Date: 6/27/01 12:10:00 PM

Lab ID: 0107001-24A **Sample Type:** SAMP

Matrix: SOIL

% Moist: 29.30

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	8670		4560	mg/Kg-dry	1	7/10/01	TOC 5050A_SSM_010710	RLG

7/11/01

7-22-01

Definitions:

ND - Not Detected at the Reporting Limit

J - Analyte detected below Reporting limits

B - Analyte detected in the associated Method Blank

H - Value exceeds Maximum Contaminant Level

* - Recovery outside limits

R - RPD outside recovery limits

E - Value above quantitation range

Surr - Denotes Surrogate Compound

M -Matrix Spike recovery outside limits

Q - Qualifier A -Result by Method of Std. Addition

D - Diluted due to matrix or extended target compounds

N - Single Column Analysis

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Laboratory Results

NYS ELAP ID#: 10486

Phone: (716) 685-8080

CLIENT: E and E Seattle Office

Lab Order: 0107001

Project: Upper Columbia River Phase I

Lab ID: 0107001-25A **Sample Type:** SAMP

Client Sample ID: ~~POPP05SD~~ GMPP05SD

Alt. Client ID: POPP05SD

Collection Date: 6/27/01 12:35:00 PM

Matrix: SOIL **% Moist:** 14.10

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	10200		2320	mg/Kg-dry	1	7/10/01	TOC 5050A_SSM_010710	RLG

MW 7-24-01

Definitions:

ND - Not Detected at the Reporting Limit

J - Analyte detected below Reporting limits

B - Analyte detected in the associated Method Blank

H - Value exceeds Maximum Contaminant Level

* - Recovery outside limits

R - RPD outside recovery limits

E - Value above quantitation range

Surr - Denotes Surrogate Compound

M -Matrix Spike recovery outside limits

Q - Qualifier A -Result by Method of Std. Addition

D - Diluted due to matrix or extended target compounds

N - Single Column Analysis

LIMS Version #: 3.1.1.9 - 7/6/01 2:00:00 PM

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Laboratory Results

NYS ELAP ID#: 10486

Phone: (716) 685-8080

CLIENT: E and E Seattle Office
Lab Order: 0107001
Project: Upper Columbia River Phase I
Lab ID: 0107001-26A **Sample Type:** SAMP

Client Sample ID: PRBK01SD
Alt. Client ID: PRBK01SD
Collection Date: 6/28/01 1:55:00 PM
Matrix: SOIL **% Moist:** 15.30

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	2570		2300	mg/Kg-dry	1	7/10/01	TOC 5050A_SSM_010710	RLG

MW 7/24/01

Definitions:
ND - Not Detected at the Reporting Limit
J - Analyte detected below Reporting limits
B - Analyte detected in the associated Method Blank
H - Value exceeds Maximum Contaminant Level
* - Recovery outside limits
R - RPD outside recovery limits
E - Value above quantitation range
Surr - Denotes Surrogate Compound
M -Matrix Spike recovery outside limits
Q - Qualifier
A -Result by Method of Std. Addition
D - Diluted due to matrix or extended target compounds
N - Single Column Analysis

IMS Version #: 3.1.1.9 - 7/6/01 2:00:00 PM

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Laboratory Results

NYS ELAP ID#: 10486

Phone: (716) 685-8080

CLIENT: E and E Seattle Office **Client Sample ID:** **PRBK02SD**

Lab Order: 0107001 **Alt. Client ID:** PRBK02SD

Project: Upper Columbia River Phase I **Collection Date:** 6/28/01 2:05:00 PM

Lab ID: **0107001-27A** **Sample Type:** SAMP **Matrix:** SOIL **% Moist:** 27.50

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	7090		2760	mg/Kg-dry	1	7/10/01	TOC 5050A_SSM_010710	RLG

MW 7240

Definitions:

ND - Not Detected at the Reporting Limit

J - Analyte detected below Reporting limits

B - Analyte detected in the associated Method Blank

H - Value exceeds Maximum Contaminant Level

* - Recovery outside limits

R - RPD outside recovery limits

E - Value above quantitation range

Surr - Denotes Surrogate Compound

M -Matrix Spike recovery outside limits

Q - Qualifier A -Result by Method of Std. Addition

D - Diluted due to matrix or extended target compounds

N - Single Column Analysis

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Laboratory Results

NYS ELAP ID#: 10486

Phone: (716) 685-8080

CLIENT: E and E Seattle Office
Client Sample ID: PRBK03SD

Lab Order: 0107001
Alt. Client ID: PRBK03SD

Project: Upper Columbia River Phase I
Collection Date: 6/28/01 2:15:00 PM

Lab ID: 0107001-28A **Sample Type:** SAMP
Matrix: SOIL **% Moist:** 20.90

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	4550		2470	mg/Kg-dry	1	7/10/01	TOC 5050A_SSM_010710	RLG

7-24-01

Definitions:
ND - Not Detected at the Reporting Limit
J - Analyte detected below Reporting limits
B - Analyte detected in the associated Method Blank
H - Value exceeds Maximum Contaminant Level
* - Recovery outside limits
R - RPD outside recovery limits
E - Value above quantitation range
Surr - Denotes Surrogate Compound
M -Matrix Spike recovery outside limits
Q - Qualifier A -Result by Method of Std. Addition
D - Diluted due to matrix or extended target compounds
N - Single Column Analysis

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Laboratory Results

NYS ELAP ID#: 10486

Phone: (716) 685-8080

CLIENT: E and E Seattle Office
Client Sample ID: PRRS04SD

Lab Order: 0107001
Alt. Client ID: PRRS04SD

Project: Upper Columbia River Phase I
Collection Date: 6/27/01 11:45:00 AM

Lab ID: 0107001-29A **Sample Type:** SAMP
Matrix: SOIL **% Moist:** 43.30

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	45600		3530	mg/Kg-dry	1	7/10/01	TOC 5050A_SSM_010710	RLG

7/11
7/24/01

Definitions:
ND - Not Detected at the Reporting Limit
J - Analyte detected below Reporting limits
B - Analyte detected in the associated Method Blank
H - Value exceeds Maximum Contaminant Level
* - Recovery outside limits
R - RPD outside recovery limits
E - Value above quantitation range
Surr - Denotes Surrogate Compound
M -Matrix Spike recovery outside limits
Q - Qualifier A -Result by Method of Std. Addition
D - Diluted due to matrix or extended target compounds
N - Single Column Analysis

LIMS Version #: 3.1.1.9 - 7/6/01 2:00:00 PM

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Laboratory Results

NYS ELAP ID#: 10486
Phone: (716) 685-8080

CLIENT: E and E Seattle Office
Lab Order: 0107001
Project: Upper Columbia River Phase I
Lab ID: 0107001-30A **Sample Type:** SAMP

Client Sample ID: PRTB06SD
Alt. Client ID: PRTB06SD
Collection Date: 6/27/01 5:15:00 PM
Matrix: SOIL **% Moist:** 31.20

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	5490		2800	mg/Kg-dry	1	7/10/01	TOC 5050A_SSM_010710	RLG

Definitions:
ND - Not Detected at the Reporting Limit
J - Analyte detected below Reporting limits
B - Analyte detected in the associated Method Blank
H - Value exceeds Maximum Contaminant Level
* - Recovery outside limits
R - RPD outside recovery limits
E - Value above quantitation range
Surr - Denotes Surrogate Compound
M -Matrix Spike recovery outside limits
Q - Qualifier A -Result by Method of Std. Addition
D - Diluted due to matrix or extended target compounds
N - Single Column Analysis

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Lancaster, New York 14086-

Laboratory Results

NYS ELAP ID#: 10486

Phone: (716) 685-8080

CLIENT: E and E Seattle Office
Client Sample ID: **PRTB07SD**
Lab Order: 0107001
Alt. Client ID: PRTB07SD
Project: Upper Columbia River Phase I
Collection Date: 6/27/01 6:05:00 PM
Lab ID: **0107001-31A** **Sample Type:** SAMP
Matrix: SOIL
% Moist: 30.70

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	38100		2850	mg/Kg-dry	1	7/10/01	TOC 5050A_SSM_010710	RLG

MV 7-24-01

Definitions:
ND - Not Detected at the Reporting Limit
J - Analyte detected below Reporting limits
B - Analyte detected in the associated Method Blank
H - Value exceeds Maximum Contaminant Level
* - Recovery outside limits
R - RPD outside recovery limits
E - Value above quantitation range
Surr - Denotes Surrogate Compound
M -Matrix Spike recovery outside limits
Q - Qualifier
A -Result by Method of Std. Addition
D - Diluted due to matrix or extended target compounds
N - Single Column Analysis

Ecology and Environment, Inc.

Analytical Services Center
4493 Walden Avenue
Lancaster, New York 14086-

Laboratory Results

NYS ELAP ID#: 10486
Phone: (716) 685-8080

CLIENT: E and E Seattle Office
Client Sample ID: PRTB08SD
Lab Order: 0107001
Alt. Client ID: PRTB08SD
Project: Upper Columbia River Phase I
Collection Date: 6/28/01 12:35:00 PM
Lab ID: 0107001-32A **Sample Type:** SAMP **Matrix:** SOIL **% Moist:** 21.60

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	599	J	2500	mg/Kg-dry	1	7/10/01	TOC 5050A_SSM_010710	RLG

7-24-01

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E - Value above quantitation range
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LIMS Version #: 3.1.1.9 - 7/6/01 2:00:00 PM

Ecology and Environment, Inc.

Analytical Services Center

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Lancaster, New York 14086-

Laboratory Results

NYS ELAP ID#: 10486

Phone: (716) 685-8080

CLIENT:	E and E Seattle Office	**Client Sample ID:**	**PRTB09SD**
Lab Order:	0107001	**Alt. Client ID:**	PRTB09SD
Project:	Upper Columbia River Phase I	**Collection Date:**	6/28/01 1:10:00 PM
Lab ID:	**0107001-33A** **Sample Type:** SAMP	**Matrix:**	SOIL **% Moist:** 22.90

Analyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
TOTAL ORGANIC CARBON BY METHOD LLOYD KAHN 1_LK_TOC_S								
Total Organic Carbon	4270		2590	mg/Kg-dry	1	7/10/01	TOC 5050A_SSM_010710	RLG

MW
7-24-01

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ecology and environment, inc.
International Specialists in the Environment
2101 Fourth Avenue, Suite 1900, Seattle, WA 98121
Tel: (206) 624-9537, Fax: (206) 621-9832

MEMORANDUM

DATE: October 5, 2001

TO: Leatta Dahlhoff, Project Manager, E & E, Seattle, WA

FROM: Mark Woodke, Chemist, E & E, Seattle, WA

SUBJ: **Total Organic Carbon Data Quality Assurance Review, Upper Columbia River Mines/Mills ESI, Stevens & Pend Oreille Counties, WA**

REF: TDD: 01-02-0028 PAN: 001281.0073.01SR

The data quality assurance review of 23 sediment samples collected from the Upper Columbia River Mines/Mills ESI in Stevens and Pend Oreille Counties, Washington, has been completed. Total Organic Carbon (TOC) analysis (Method Lloyd Kahn) was performed by the Ecology and Environment, Inc., Analytical Services Center, Lancaster, New York.

The samples were numbered:

01090401	01090402	01090403	01090404	01090405	01090406
01090407	01090408	01090409	01090410	01090411	01090412
01090413	01090426	01090427	01090428	01090429	01090430
01090431	01090432	01090441	01090442	01090443	

Data Qualifications:

1. Sample Holding Times: Acceptable.

The samples maintained within the QC limits of $4^{\circ}C \pm 2^{\circ}C$. The samples were collected between September 10 and 13, 2001, and were analyzed by September 25, 2001, therefore meeting QC holding time criteria.

2. Calibration: Acceptable.

A four-point initial calibration was performed prior to each analysis sequence with a correlation coefficient ≥ 0.995. A minimum of one calibration standard and a blank were analyzed after every 10 samples with all recoveries within the QC limits of 90 % to 110 %.

3. Blanks: Satisfactory.

A preparation blank was analyzed for each 20 samples or per matrix per concentration level. Blanks were analyzed after each initial or continuing calibration. There were the following detections in method blanks:

Batch / Date	Analyte	Concentration
010924101R / 9-24-01	TOC	600 mg/kg
010925101R / 9-25-01	TOC	300 mg/kg

Sample results less than five times the associated blank concentration were qualified as not detected (U).

4. Laboratory Control Sample (LCS): Acceptable.

A LCS was analyzed with each batch of 20 samples with all recoveries within QC limits of 71 % to 125 %.

5. Quadruplicate Analysis: Acceptable.

A quadruplicate analysis was performed per 20 samples per matrix. Both sets of quadruplicate results had relative percent differences greater than the QC limit of < 30 %. No action was taken based on these outliers as the initial sample results were less than two times the sample quantitation limit.

6. Overall Assessment of Data for Use

The overall usefulness of the data is based on the criteria outlined in the OSWER Guidance Document "Quality Assurance/Quality Control Guidance for Removal Activities, Sampling QA/QC Plan, and Data Validation Procedures" (EPA/540/G-90/004) and the analytical method. Based upon the information provided, the data are acceptable for use with the above stated data qualifications.

Data Qualifiers and Definitions

U - The material was analyzed for but was not detected. The associated numerical value is the sample quantitation limit.

J - The associated numerical value is an estimated quantity because the reported concentrations were less than the practical quantitation limits or because quality control criteria limits were not met.

The following bias qualifier was added to estimated quantities:

Q - The sample result is less than the sample quantitation limit.

Ecology and Environment, Inc.
Analytical Services Center
493 Walden Avenue
ancaster, New York 14086-

Laboratory Results

NYS ELAP ID#: 10486
Phone: (716) 685-8080

lient: E and E Seattle Office
ab Order: 0109123
roject: Upper Columbia River Phase I
ab ID: 0109123-04A Sample Type: SAMP Matrix: Soil

Client Sample ID: 01090441
Alt. Client ID: MDSB01SD
Collection Date: 9/12/01 9:30:00 AM % Moist:33.70
Test Code: 1_LK_TOC_S

OTAL ORGANIC CARBON BY METHOD LLOYD KAHN Method: LLOYD KAHN Prep Method: NA

nalyte	Result	Q	Limit	Units	DF	Date Analyzed	Run Batch ID	Analyst
otal Organic Carbon	17100		2760	mg/Kg-dry	1	9/24/01	TOC 5050A_SSM_010924	MYO

MW
10-5-01

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IS Version #: [illegible] Printed: Monday, October [illegible]

1.8

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10 LABORATORY
7411 Beach Dr. East
Port Orchard, Washington 98366

July 25, 2001

MEMORANDUM

SUBJECT: Field Screening Metals Results for the Upper Columbia River - Mining Area Analyses

FROM: Gerald H. Dodo
USEPA

TO: Monica Tonel
USEPA

cc: Leatta Dahlhoff
Ecology and Environment

Attached to this memo are the field screening analysis results for lead, zinc, and mercury acquired by ESAT for 84 samples at the Upper Columbia River mining areas. This work was performed under site account code 01T10P50102D106XLA00. The samples were analyzed in-situ using a Niton XL-723. Reference sample analyses were performed during each day of sample analyses using NIST SRM 2710. The reference sample results were within 20% of the stated true value, however, mercury was present at a concentration too low to be detected for this sample. All results were qualified F, acquired by a field screening method.

If you have any questions, please contact me at (360)871-8728.

151756

Summary of XRF Screening Results
Lake Roosevelt Mine Study

Results in mg/Kg

No	Location	Sample ID	Date/Time	Zn	Pb	Hg
6	Red Top Rock Pile		6/18/01	1720	758	<26
7	Red Top Rock Pile	RDWR01SS	6/18/01	12896	15091	<96
8	Red Top Rock Pile		6/18/01	600	187	<18
9	Red Top Rock Pile	RDWR02SS	6/18/01	24589	8275	158
10	Red Top Rock Pile	RDWR03SS	6/18/01	7136	2640	<53
17	Copper King WR	CKWR01SS	6/19/01	434	327	<34
18	Copper King WR		6/19/01	159	103	<23
19	Copper King WR	CKWR02SS	6/19/01	< 225	226	<37
20	Copper King WR		6/19/01	< 240	121	<45
21	Copper King WR		6/19/01	< 144	173	<29
23	Black Rock Mine	BRWR01SS	6/19/01	181965	3709	216
24	Black Rock Mine	BRWR02SS	6/19/01	126976	698	<93
25	Black Rock Mine		6/19/01	12499	44	<31
26	Black Rock Mine		6/19/01	40294	417	<48
27	Black Rock Mine	BRWR03SS	6/19/01	358810	1130	286
32	Last Chance TP	LCTP05SS	6/20/01	124928	84070	<360
33	Last Chance TP	LCTP06SS	6/20/01	99994	41984	<270
34	Last Chance TP		6/20/01	43699	16192	<116
35	Last Chance Interfac	LCTP07SS	6/20/01	26394	7578	<85
36	Last Chance TP		6/20/01	21094	10694	<82
49	Great Western		6/21/01	39475	2570	75
50	Great Western	GWWR02SS	6/21/01	48077	3978	<70
51	Great Western		6/21/01	16691	1890	<42
53	Great Western		6/21/01	20595	1880	<48
54	Great Western		6/21/01	97792	10995	<195
55	Great Western	GWWR01SS	6/21/01	38784	2890	<74
57	Gladstone TP	GLTP01SS	6/21/01	14989	43085	<210
58	Gladstone TP		6/21/01	8608	18099	<134
59	Gladstone TP	GLTP02SS	6/21/01	17894	53965	<285
60	Gladstone TP		6/21/01	15898	30285	<195
61	Gladstone TP	GLTP03SS	6/21/01	16294	44493	<300
71	Electric Point Upper		6/22/01	1030	3920	<58
72	Electric Point Upper	EPWR03SS	6/22/01	1810	4867	<44
73	Electric Point Upper		6/22/01	1380	3808	<41
74	Electric Point Upper	EPWR02SS	6/22/01	2739	4218	<75
75	Electric Point Upper	EPWR01SS	6/22/01	2789	4067	<48
77	Electric Point Lower		6/22/01	12096	10298	<94
78	Electric Point Lower	EPWR07SS	6/22/01	32589	17600	147
79	Electric Point Lower	EPWR08SS	6/22/01	23693	19098	<195

No	Location	Sample ID	Date/Time	Zn	Pb	Hg
				JT 7-25-01	JT 7-25-01	JT 7-25-01
85	Van Stone Mine		6/23/01	8467 F	379 F	<27 F
87	Van Stone Mine	VSWR01SS	6/23/01	17293	1440	<45
88	Van Stone Mine		6/23/01	1520	62	<17
90	Van Stone Mine		6/23/01	236	30	<14
91	Van Stone Mine	VSWR02SS	6/23/01	6944	344	<28
92	Van Stone Mine		6/23/01	5059	91	<25
94	Van Stone Mine		6/23/01	112	43	<13
95	Van Stone Mine	VSWR03SS	6/23/01	5827	154	<29
96	Van Stone Mine		6/23/01	3290	271	<24
97	Van Stone Mine		6/23/01	2629	299	<21
98	Van Stone Mine		6/23/01	5878	363	<27
99	Van Stone Mine	VSWR04SS	6/23/01	10797	847	<44
100	Van Stone Mine	VSWR05SS	6/23/01	11898	1730	<49
101	Van Stone Mine		6/23/01	4048	143	<26
102	Van Stone Mine		6/23/01	3920	687	<37
104	Van Stone Mine		6/23/01	18394	2210	<63
105	Van Stone Mine	VSWR06SS	6/23/01	34586	3878	<74
106	Van Stone Mine		6/23/01	29082	2629	<64
107	Van Stone Mine		6/23/01	4029	879	<28
108	Van Stone Mine	VSWR07SS	6/23/01	20890	6739	<68
109	Van Stone Mine	VSWR08SS	6/23/01	5600	361	<37
110	Van Stone Mine		6/23/01	5389	133	<24
112	Van Stone Mine		6/23/01	4730	128	<26
113	Van Stone Mine		6/23/01	4067	118	<30
114	Van Stone Mine	VSWR09SS	6/23/01	5040	61	<20
115	Van Stone Mine		6/23/01	4490	331	<24
116	Van Stone Mine		6/23/01	3398	738	<44
117	Van Stone Mine	VSWR10SS	6/23/01	3760	796	<51
118	Van Stone Mine		6/23/01	3210	1300	<39
119	Van Stone Mine		6/23/01	3930	1540	<44
120	Van Stone Mine	VSWR11SS	6/23/01	3160	221	<25
121	Van Stone Mine		6/23/01	5139	< 24	<19
122	Van Stone Mine		6/23/01	502	38	<20
123	Van Stone Mine	VSWR12SS	6/23/01	2939	906	<35
124	Van Stone Mine		6/23/01	3099	243	<23
125	Van Stone Mine		6/23/01	944	95	<36
133	Pend Oreille TP	POTP04SS	6/25/01	852	396	<21
134	Pend Oreille TP		6/25/01	648	413	<17
135	Pend Oreille TP		6/25/01	647	298	37
137	Pend Oreille TP		6/25/01	991	410	<24
138	Pend Oreille TP		6/25/01	595	416	<26
139	Pend Oreille TP	POTP05SS	6/25/01	1709	592	<30
141	Pend Oreille TP	POTP06SS	6/25/01	1890	612	<36
142	Pend Oreille TP		6/25/01	973	381	<30
143	Pend Oreille TP		6/25/01	661	240	<24